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The Hospitalist®

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Dr. Joan Curcio, hospitalist and associate director of medicine, Elmhurst Hospital, Queens, N.Y.

Courtesy New York City Health and Hospitals Corporation

NYC public hospitals rose to the demands of the COVID-19 crisis

Hospitalists at the center of the storm

By Larry Beresford

New York City Health + Hospitals (NYCH+H), the country's largest public health care system, encompasses 11 hospitals with 4,354 staffed acute beds during normal times. It serves as the safety net for 1.1 million of the 8.4 million residents of the most populous city in the United States, many of them uninsured, undocumented, covered by Medicaid, or otherwise disadvantaged.

At the very epicenter in the early days of the historic COVID-19 pandemic, NYCH+H transferred patients between its facilities, added medical and ICU beds by the hundreds,

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Hospitalist Movers and Shakers

By Matt Pesyna

The American Board of Internal Medicine has named **David Pizzimenti, DO,** to its board of trustees. The appointment comes with a 3-year term.

Dr. Pizzimenti has been a practicing internist in Mississippi since 2005. He currently serves as associate medical officer of acute care at North Mississippi Medical Center, Tupelo, where he also directs the hospitalist program and the internal medicine residency program. Prior to joining NMMC, he managed the same role at Magnolia Regional Health Center (Corinth, Miss.).

Dr. Pizzimenti is an inducted member of the American College of Osteopathic Internist College of Fellows, as well as a certified wound care specialist.

Tommy Ibrahim, MD, FHM, recently was named the new president and CEO for Bassett Healthcare Network, replacing William Streck, who had served in the role from 1984 to 2014, and then on an interim basis since 2018.

Dr. Ibrahim

Dr. Ibrahim comes to Bassett from Integris Health, the largest nonprofit health care system in Oklahoma, where he was executive vice president and chief physician executive. He started his career as a hospitalist before moving into administration, and is a fellow in hospital medicine as well as a fellow of the American College of Healthcare Executives.

Bassett Healthcare Network is based at Bassett Medical Center in Cooperstown, N.Y., and includes four hospitals and more than two dozen primary care centers in eight New York counties.

Russell Kerbel, MD, MBA, has been named medical director for sepsis prevention at the University of California, Los Angeles. Since his arrival at UCLA in 2014, Dr. Kerbel – a hospitalist by training – has worked to increase awareness and standardize sepsis treatment through his advocacy, interdepartmental collaboration, and informatics knowledge.

Joshua Lenchus, DO, RPh, SFHM, was installed as vice president of the Florida Medical Association during the all-virtual 2020 FMA annual meeting in August. Dr. Lenchus is a hospitalist and chief medical officer at the Broward Health Medical Center in Fort Lauderdale, Fla.

Dr. Lenchus

Christopher Carpenter, MD, has been elevated to chief of staff at Natividad, a 172-bed, county-owned hospital in Salinas, Calif. Dr. Carpenter has served Natividad for the past 4 years, holding the positions of chief hospitalist, chief of service for pediatrics, vice chief of staff, and most recently director of pediatric services.

Dr. Carpenter's term as chief of staff is limited to 2 years, during which he said his goals include promoting diversity within the facility's leadership.

Prior to arriving at Natividad, Dr. Carpenter was instructor of pediatrics at Harvard Medical School, Boston, as well as associate director of the Boston Children's Hospital Pediatric Global Health Fellowship.

David Fagan, MD, recently was promoted to medical director at Mid-State Health Center (Plymouth, N.H.), where he has served for the past 10 years. The 30-year medical veteran began working in his new role in May 2020.

Previously, Dr. Fagan has served the facility as an internist and hospitalist, and he has been among the leaders at Mid-State in ensuring safety for patients and staff during the COVID-19 response.

The Carroll County Memorial Hospital (Carrolton, Mo.) recently announced its new hospitalist program, which officially began on June 1, 2020. CCMH officials said the focus of the hospitalists will be to maintain communication with primary care physicians once patients leave the hospital facility.

CCMH added three physicians to its staff to work in the hospitalist program: Reuben I. Thaker, MD; Samuel C. Evans, MD; and Charles C. Glendenning, DO.

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The Board Room

In a time of two pandemics, a recommitment to work together

By Jerome C. Siy, MD, MHA, SFHM

Overwhelmed. As if we weren't already overwhelmed. For decades, hospitalists have been on the forefront of improving acute care amidst a rapidly changing environment. These last few decades have seen tremendous advances in medicine, technology, safety culture, innovations in payment models, transformation in business models, and a rising tide of health care policy. There was never a year we didn't face major change … and adapt to it. Then 2020 came upon us.

This year, we adapt to more than a score and 4 years' worth of change.

The two pandemics that have come upon us are like tsunamis. And many of us are drowning. We know of threats of pandemics: influenza, Ebola, and the like. But SARS-CoV-2 is new and like no other. We live in fear and isolation, each and every day learning new information and debunking old. We also know of racial injustice and racism, implicit or explicit in our nation, whether we live it or just read of it. George Floyd's death in my hometown marked another tsunami, a great realization in our nation, and a great unmasking of our denial.

Yet our country is not united.

Hospital medicine is not immune to this disunity. At a time that we are all treading water, staying afloat in our own hospitals and communities, confronting these issues beyond our immediate spheres of influence is overwhelming. We are impacted by these pandemics, personally and professionally. And admittedly, we can be both victim and perpetrator.

In the face of a novel infectious agent, medicine responded quickly and pushed us beyond our limits. We have developed new infection prevention guidelines. We worked creatively to solve PPE shortages. We fashioned new work flows and new care models. We accelerated telehealth applications. We expanded the boundaries on home-based programs and reached out to vulnerable elderly in congregate living – an isolation no older person should have to endure. We cared for our colleagues, neighbors, and family members who fell ill, some who recovered, and sadly, some who fell. We developed best-practice guidelines, research protocols, new order sets, note templates, and documentation standards. We flexed into EDs, ICUs, and field hospitals. Amidst the turmoil, we took pay cuts and saw colleagues go on furlough. And still, we mentored leaders in our schools, churches, synagogues, mosques, and civic communities.

And just when we thought we could endure no more, on May 25, we witnessed a black man in Minneapolis killed by a policeman's knee. The same knee that divided Americans when black American athletes knelt to protest the injustice their people have endured for centuries. A knee that has been confused for insolence, when it was meant for justice … yes, justice, for all. So, in early June, around the nation in support of black lives we also knelt, for almost 9 minutes.

This was the third time I cried during the pandemics.

TVERDOKHLIB/SHUTTERSTOCK

For many of us, structural racism in America had finally been unmasked. The nation protested and rioted for weeks, and some communities have continued. Indeed, these two pandemics are still surging.

Side by side COVID-19 case conferences, we lay transparent data demonstrating health disparities that we have tolerated for so long. We have vowed to resource equity work, and we opened dialogue, not only with patients and communities of color, but also with colleagues of color – some ready and some not yet ready to share and relive the traumas of their past and their present.

And still, we are not united.

While we physically mask to prevent the spread of COVID-19, we must make efforts to unmask the truths of SARS-CoV-2, the failings of our health system, the richness of our communities of color, and the injustice in the fabric of our society. More importantly, we must work together to create solutions. While we have diverse interests and priorities, at SHM, we can find common ground with kindred spirits, enhance the role of our specialty, and advance the health of our patients.

Let's not be mistaken. These pandemics add to a growing list of interwoven issues in our society. In 2018, I wrote a piece on the role of hospitalists in addressing rural health disparities.[1] According to the Sheps Center for Health Services Research, 129 rural hospitals have closed since 2010, closures that have accelerated with the COVID-19 pandemic.[2] More than ever, we must stand above our inner and outer conflicts and be united to promote the health of our nation during these pandemics, because "all policy is health policy."[3]

Most SHM presidents and president-elects come in with a platform, a priority for the specialty and for the society. This year, the platform has chosen us. For 20 years, I have witnessed SHM be a workshop for our members to address the pressing needs of our specialty and our patients. In 2020, we've continued to see SHM as a workshop for our members and a tour de force addressing these pandemics, from just-in-time publications of research and perspectives in the Journal of Hospital Medicine, to webinars and open-access education in the Learning Portal, to advocacy on Capitol Hill. All of that work has been informed by you and for you. While there is still so much to do, we need not be overwhelmed when we do it together.

A score and 4 years ago, Robert Wachter, MD, and Lee Goldman, MD, dubbed us "hospitalists." A year later, our shared workshop was born. Through one name change and now our first CEO transition from Larry Wellikson, MD, to Eric Howell, MD, SHM will continue to be where hospitalists both adapt and shape our nation through solutions that put an end to these pandemics. Let's recommit to this work together.

Dr. Siy is division medical director, hospital specialties, in the departments of hospital medicine and community senior and palliative care, at HealthPartners in Bloomington, Minn. He is president-elect of SHM.

Sources

1. Hardeman RR et al. Stolen breaths. N Engl J Med. 2020 Jul 16;383:197-9.

2. Siy JC. Reviving rural health care. The Hospitalist. 2018 Sep 24.

3. The Cecil G. Sheps Center For Health Services Research. Rural hospital closures. 2014. https://www.shepscenter.unc.edu/programs-projects/rural-health/rural-hospital-closures/.

Hospital medicine in a worldwide pandemic

SHM releases 2020 *State of Hospital Medicine* Report

By Larry Beresford

Every 2 years the Society of Hospital Medicine's Practice Analysis Committee (PAC) surveys hospitalist groups nationwide on such key practice parameters as compensation, services provided, hours of work, and participation in leadership roles. Combined with compensation and productivity data on adult and pediatric hospitalists collected by the Medical Group Management Association, licensed to SHM for inclusion in this report, the *State of Hospital Medicine* (*SoHM*) Report is the most authoritative and comprehensive source of information regarding contemporary hospitalist practice.

This year's biannual report is based on survey responses submitted between Jan. 6 and Feb. 28, 2020, by 502 hospitalist group practices. That's slightly fewer groups reporting data than for past surveys, but these groups were larger, on average, resulting in more full-time equivalents (FTEs) incorporated into the results, said PAC member Leslie Flores, MHA, SFHM, of Nelson Flores Hospital Medicine Consultants. A total of 19.7% of the reporting groups provided pediatric hospital medicine data only, a much larger proportion than in past years.

The report is slated for publication in September, and SHM members can purchase it at a discount in print or electronic versions. "Our sense is that a lot of the fundamental information in the report will not have changed that much from 2018," Ms. Flores said. "But these results convey the state of the field prior to the world-altering impact of the COVID-19 pandemic on hospitals of all sizes and settings." How the hospital business and the practice of hospitalist groups have been and will be impacted by the pandemic, obviously, aren't reflected in the data.

"We are finalizing a supplemental survey to go out to members at the end of the summer, specifically asking how COVID has impacted their hospitalist groups," Ms. Flores said. These COVID-19 supplemental results will be released after the main report, sometime around the end of September. But results from the main survey, showing consistency in a number of key parameters, indicate that hospitalists continue to have a large and essential role in the U.S. health care system.

The leadership offered by hospitalists in the U.S. health care system's response to surges of COVID-19 patients in many hospitals only underscores their importance, Ms. Flores added. "Hospitalists have definitely proven their worth. Imagine what the pandemic would have been like for hospitals if our specialty hadn't been well-positioned to respond." Hospitalists also showed an ability to adapt quickly to crises on the ground. But financial pressures imposed by the pandemic, combined with other trends previously in play, suggest that demands to cut costs and do more with less will be relentless as the field – and the world – tries to pull out of the pandemic crisis.

Ms. Flores

Compensation trends

One of the most eagerly anticipated findings in the *SoHM* is compensation. Data licensed by SHM from the MGMA show the median compensation for all adult hospitalists during 2019 was $307,633 (with an average of $317,640), higher in the Midwest and lower in the East. The average base rate share of hospitalist compensation was 81.3%, with 11.6% based on productivity and 7.1% for performance – scored on such measures as patient satisfaction; accuracy and/or timeliness of documentation, billing, and coding; clinical processes; early morning discharge orders and times; and readmissions rates. A total of 46.6% of responding groups said they anticipated an increase in budgeted FTEs in the next year, while 51.2% expected to stay the same.

> *"These results convey the state of the field prior to the world-altering impact of the COVID-19 pandemic on hospitals of all sizes and settings."*

Subsidies or financial support for hospitalist practices break down in different ways, but in 2019 the median figure for financial support provided per adult hospitalist FTE was $198,750 (average, $201,760). This suggests that hospitals continue to see hospitalists as valued partners in health care, with useful knowledge of how the various components of the health care system work, said Tresa McNeal, MD, a hospitalist at Baylor Scott & White Medical Center, Temple, Tex., and a member of the PAC.

Scope of practice

Scope of practice for the hospitalist model continues to evolve, with increased demand for comanagement roles as other medical specialties are less inclined to visit patients in the hospital. Surgical comanagement accounted for much of that growth, but there were significant rates of comanagement for neurology, gastrointestinal and liver medicine, cardiology, and palliative care.

"Comanagement is a broad term without a single clear definition," Ms. Flores said. "But when I talk about it, I refer to a broader array of hospitalists interacting with specialists." The hospitalist's role could be as a consultant, or taking responsibility for admitting and attending.

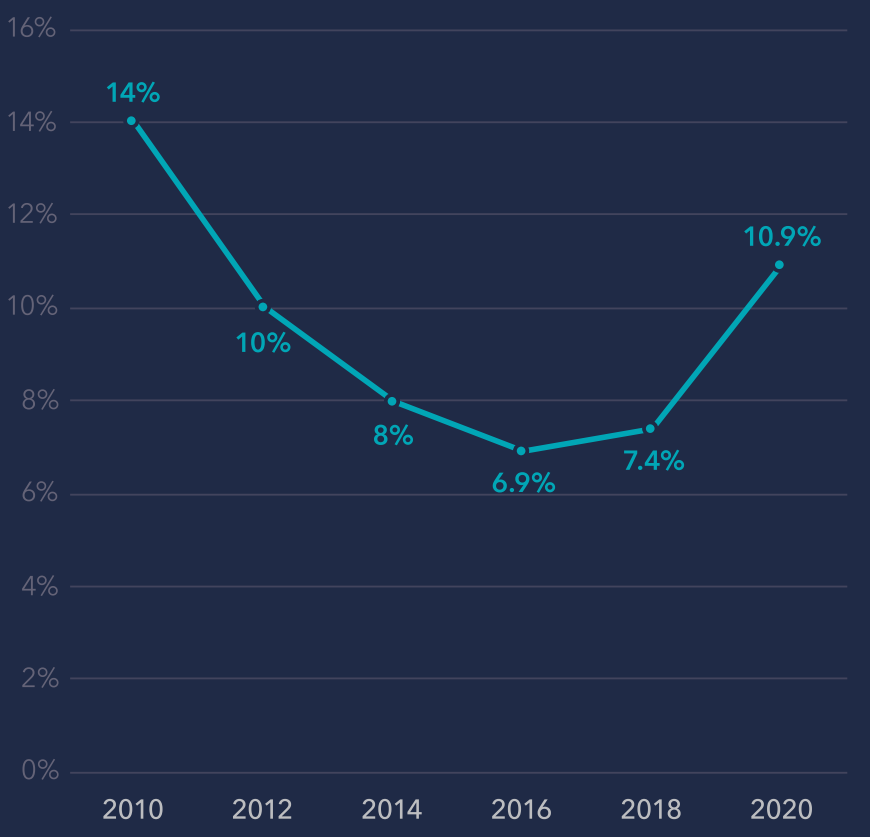
Other identified roles played by hospitalists in adult-only groups included care for patients in the ICU (59.6% of reporting groups); primary responsibility for observation/short stay units, rapid response teams, or code blue/cardiac arrest teams; cross-coverage for patients admitted without a hospitalist; and procedures such as vascular access, lumbar puncture, paracentesis, and thoracentesis. The hospitalist's role in the ICU likely increased in many hospitals confronting COVID surges, Ms. Flores said.

The median number of shifts performed per year by a full-time hospitalist physician was 182.0 (average, 182.3), with 12 hours as the most common average duration for a shift in a daytime schedule. The 7-days-on/7-days-off model remained the most popular way to schedule adult hospitalists, at the same rate as in

Continued on page 6

Figure 3.5d

Average Physician Turnover Rate in Adult HMGs, by Year



This graphic was taken from the 2020 *SoHM* Report.

Courtesy SHM Practice Analysis Committee

REIMAGINING HOSPITAL MEDICINE

Evolving Beyond HOSPITAL WALLS

By Joshua Niebruegge, MD

IN EARLY MARCH, at the very beginning stages of the COVID-19 pandemic, my colleague Behfar Dianati, MD, hospitalist medical director at a small Midwestern practice, admitted a patient with apparent flu. A week later, he, his wife, and their two children were sick with COVID-19.

Meanwhile, at the hospital, Dr. Dianati's team was short-staffed and struggling after a second hospitalist came down with COVID-19. From his spare bedroom, Dr. Dianati worked tirelessly with the hospital, nursing, and Vituity leadership to implement a virtual rounding program that allowed him to singlehandedly manage the COVID-19 ward from home.

THE IMPORTANCE OF PATIENT-CENTERED CARE

As a fellow hospitalist, I believe his virtual rounding solution illustrates the direction hospital medicine must be headed.

In the next 3 to 5 years, care will no longer revolve around the hospital except for those most critically ill. It's imperative that we meet patients where and when they need us.

COVID-19 is accelerating a shift of the acute care outside of hospital walls, thanks to recent advancements in virtual care. Virtual rounds and consults protect staff, preserve personal protective equipment (PPE), and allow hospitalists to care for patients across a region.

To increase hospital capacity, many health systems are establishing hospital-at-home programs. Stable patients with appropriate diagnoses are transported home, where they are managed virtually by the hospitalist team. They also receive in-person visits from mobile nursing teams and ancillary services units. If concerns arise, patients have access to a virtual call button monitored remotely by a registered nurse.

While the hospital-at-home model is still in its early stages, we see every indication that it provides high-quality care and delivers high patient satisfaction.

CLINICAL LEADERSHIP WILL DRIVE THE FUTURE

As our specialty continues to evolve in the face of the pandemic and beyond, we need to create new fast, flexible, and innovative models. Physicians and advanced providers represent the healthcare system's greatest innovation assets. Because of our close daily connection with patients, we are well-positioned to identify salient pain points and capitalize on opportunities to remedy them.

COVID-19 has challenged hospitals and providers more than any other healthcare crisis in our lifetimes. At the same time, it has opened the door for sweeping transformation. Our future state is limited only in how wedded we remain to today's definition and role of a hospitalist.

Vituity hospitalists are evolving critical care with a front-line driven approach that delivers innovative care delivery and provides more options for patients to access the care when and where they need it. Learn more at **www.vituity.com/HM-future.**

Joshua Niebruegge, MD, is Vice President of Hospital Medicine Operations at Vituity. He practices hospital medicine in Illinois.

Continued from page 4

2018. Backup coverage is another important issue for hospitalist groups, with 52.6% reporting no formal backup system. For those with a backup system, the highest proportion paid no additional compensation to the physician for being on the on-call schedule, but additional compensation was paid if called into the hospital.

Presence of nocturnists was reported by 71.9% of responding groups, slightly down from 2018, but increasing with the size of the group. "We continue to see a trend for dedicated nocturnists," said Dr. McNeal. Hospitals see the benefits from the presence of a nocturnist, reflected in pay differentials or requiring fewer full-time shifts from nocturnists. It's more consistent, higher quality of care delivered by people who are dedicated to that role.

In other findings from the survey, turnover in adult hospitalist groups is 10.9%, which is up from 2018 but down from 2010. Unit-based assignment, also known as geographical rounding, was utilized by 42.7% of responding adult groups, with likelihood increasing with the size of the group. Unfilled positions were reported by 73.5% of groups, with an average of 11.2% of positions unfilled at the time of the survey.

Dr. McNeal

The use of telemedicine in the hospital setting is evolving, likely considerably accelerated of necessity by the pandemic. "Many of us are using telemedicine with COVID patients in order to decrease clinicians' time in the room, and to find a way to use a work force that has to be on leave," Dr. McNeal said.

Nurse practitioners and physician assistants

The role for nurse practitioners and physician assistants in adult hospital medicine groups continues to increase, with 83.3% of groups reporting the presence of PAs and NPs, up from 77% in 2018. NPs/PAs are more likely in multistate hospitalist groups or integrated delivery system practices in hospitals/health systems.

The most common billing model for their professional services is a combination of independent billing by the PA/NP where allowed and shared services billing under a supervisory physician's provider number – although 8.1% of groups report that their NPs/PAs didn't generally provide billable services or submit bills for payment.

> *"It also takes some investment in time and training for [NPs/PAs] to be able to practice at the top of their license."*

NPs and PAs spend one-fifth of their time, on average, on nonbillable, value-added work, including dedicated cross-coverage shifts, scheduling, patient assignments, nonbillable clinical work such as glycemic control, and quality improvement and performance improvement activities. "This is one example of the changing skill mix for the hospitalist group, helping the practice become more efficient," Ms. Flores said.

NPs and PAs provide valuable services, Dr. McNeal added. "But it also takes some investment in time and training for them to be able to practice at the top of their license. My own hospitalist group has a training program for newly hired NPs/PAs. Everyone goes through this orientation for around 6-10 weeks, largely in a shadowing role starting out, until they gradually adjust to more clinical autonomy."

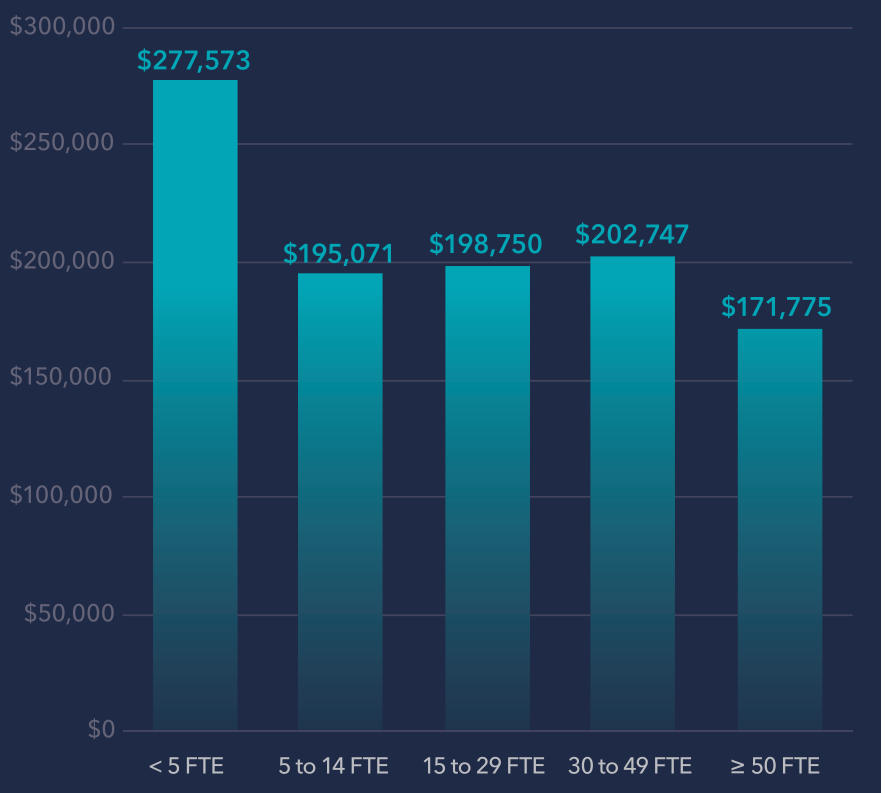
This onboarding includes real-time evaluations and self-evaluations, and opportunities for conversations with experienced clinicians, working from a list of 30 "bread-and-butter" topics in hospital medicine, she noted.

Pediatric hospital medicine

The 2020 *SoHM* Report includes a greater representation for pediatric hospital medicine, with a 200% increase in the proportion of reporting hospitalist groups that take care of only children. Thus, the pediatric data are more robust – and helpful – than in prior year surveys, said Sandra Gage, MD, SFHM, a pediatric hospitalist at Phoenix Children's Hospital. Dr. Gage headed up the PAC's expanded pediatric data initiative, with targeted outreach to pediatric groups to encourage their participation. She also convened

Figure 3.18a

Median Financial Support Per FTE Employed Physician in Adult HMGs, by Group Size

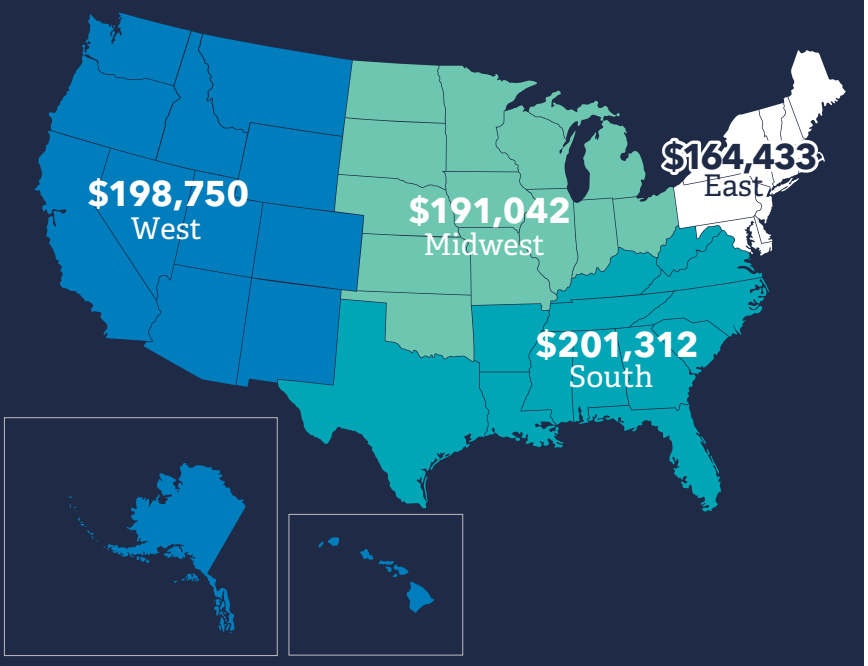


Note: This looks at the amount of financial support per FTE physician employed by the group, distributed equally among the physician FTEs. Financial support was defined in the *SoHM* Survey as "monies or in-kind services/resources provided by a hospital or other organization to help an HMG offset any losses resulting from the failure of professional fee revenues to cover all direct expenses."

This graphic was taken from the 2020 *SoHM* Report.

Figure 3.18a

Median Financial Support Per FTE Employed Physician in Adult HMGs, by Region



Note: This looks at the amount of financial support per FTE physician employed by the group, distributed equally among the physician FTEs. Financial support was defined in the *SoHM* Survey as "monies or in-kind services/resources provided by a hospital or other organization to help an HMG offset any losses resulting from the failure of professional fee revenues to cover all direct expenses."

This graphic was taken from the 2020 *SoHM* Report.

Courtesy SHM Practice Analysis Committee

a task force to come up with pediatric-specific questions that were more pertinent and user friendly.

One of the important questions for pediatric hospitalists involves scheduling – including variations in length of shifts – which can vary dramatically in pediatric HM groups. "This year we reported by number of hours expected for a clinical FTE, which should be more useful for group leaders," Dr. Gage said. The median number of hours

> *"I think PHM evolved a little later than for adult hospitalists, but it has clearly come into its own as a field."*

required per FTE from pediatric hospitalists was fairly consistent at 1,800 per year, with minor variations based on region and academic status.

"I don't know that there's anything too surprising in most of the data," she said, but noted that SHM will now have a better pediatric baseline going forward. The survey also asked how many pediatric hospitalists were board certified in the new subspecialty of pediatric hospital medicine under the program launched last year by the American Board of Pediatrics. Its first qualifying exam was in November 2019. The average was 26%, but the variation between academic and nonacademic programs was unexpected, Dr. Gage said.

Pediatric hospitalists come from a variety of professional specialties besides pediatrics. Nearly half of all programs had at least one med/peds provider, while a smaller number of programs had providers from family medicine, internal medicine, emergency medicine, or palliative care, she noted. Half of pediatric hospitalists reported joining their practice directly out of residency. About 26% of pediatric hospital medicine (PHM) physicians were described as part time, and 34.3% of pediatric groups had the presence of an NP or PA.

"I think PHM evolved a little later than for adult hospitalists, but it has clearly come into its own as a field," Dr. Gage said. In the COVID-19 crisis, some pediatric hospitalists have been asked to care for adult patients, which necessitated a flurry of activity to refresh their medical knowledge. Where pediatric units existed within the walls of adult hospitals and were temporarily closed for COVID, it's not clear how many will reopen – perhaps ever.

Long-term impacts of the crisis

Some of the hospitalist group leaders Ms. Flores has spoken with in recent months point out that, while New York and some other early COVID-19 hot spots experienced a tremendous surge of patients and hospital crowding in March and April 2020, other hospitals didn't see anywhere near the impact.

Dr. Gage

"For some, there was nothing going on with COVID where they were," she said. Elective surgeries were widely canceled, but with no corresponding increase of COVID admissions; and with fewer patients showing up in EDs, some physicians found themselves idled.

What will be the longer-term impact of COVID-19? How will it change hospital medicine? "I definitely think things are going to change," Ms. Flores said, speculating that licensing boards could find a way to make it easier for physicians to practice across state lines in response to crises like the pandemic. "Do we need to think at the national level about what we can do to create more surge capacity, to move people when and where they need to go in a crisis? Are there things SHM could do to help?"

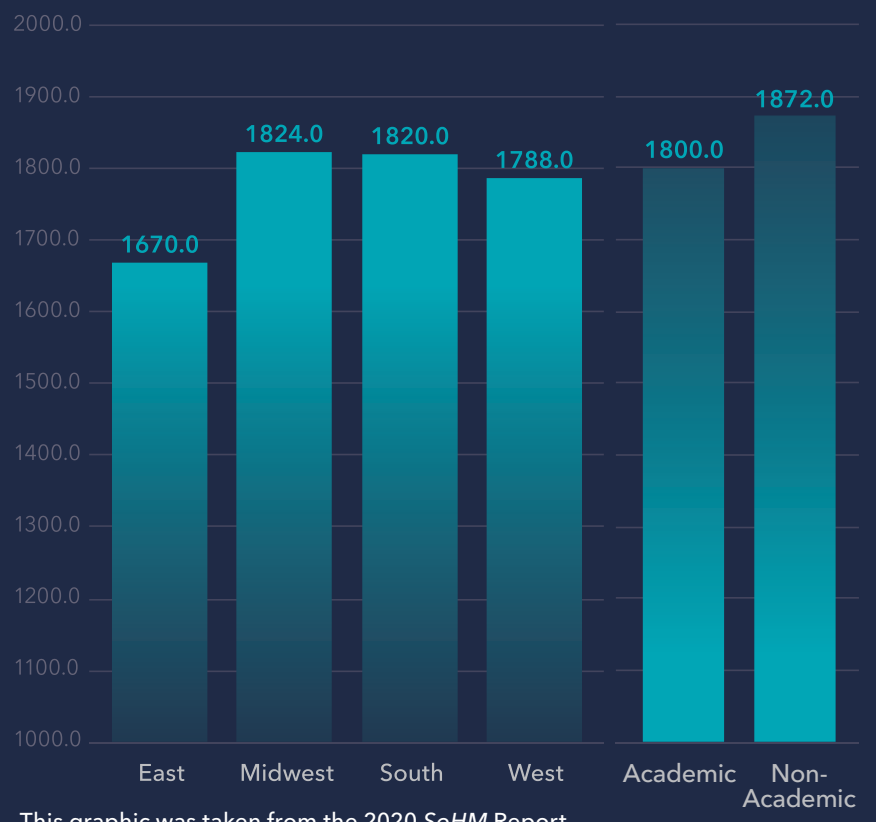
Dr. Frederickson

Ms. Flores expects more hospital closures than followed the 2008-2009 economic recession, which likely will further drive the trend toward mergers and acquisitions – both of hospitalist groups and of hospitals.

"From the point of view of hospitals, financial pressures will only get worse, pressing us to reinvent how hospitalists work and how that could be made more efficient," she said. "I hear hospitals saying: 'We can't sustain current trends.' Meanwhile, specialists are saying they need more help from hospitalists, and frontline hospitalists are saying they're already working too hard. What will we do about burnout?"

Figure 4.9c

Median Number of Clinical Hours Required for a 1.0 FTE in Pediatric HMGs, by Region and Academic Status



This graphic was taken from the 2020 *SoHM* Report.

Courtesy SHM Practice Analysis Committee

These competing trends were all headed toward a perfect storm even before the epidemic hit, Ms. Flores said. "The response will require some innovations we haven't yet conceived of. Incremental change won't get us where we need to be. But the hospitalist's role will be more essential than ever."

> *While hospitalist compensation continues to go up, workload and by extension productivity remain relatively flat.*

The 2020 data show that a lot of things have been fairly steady for hospitalists, said Thomas Frederickson, MD, a member of SHM's PAC and a specialist in hospital medicine at CHI Health in Omaha, Neb. But one concern about this stability is that, while hospitalist compensation continues to go up, workload and by extension productivity remain relatively flat. "That has been a trend over the past decade, and some of us find it hard to make sense of that."

Dr. Frederickson, too, sees a need for disruptive innovation. "I just wish I knew what that will be." Perhaps, just as hospitalists played a large role in the quality revolution in hospitals over the past decade, maybe in the next decade they will come to play a large role in the right-sizing of hospital care in health systems, he said.

One other important finding: The number of hospitalists per group who play roles as physician leaders has also increased, with an average of 3.2 physicians per group in a formal leadership role (median of 2). But currently, 73% of the highest-ranking leaders in hospitalist groups are male, and they are disproportionally white. As reported in Medscape in 2019, 40% of working hospitalists are women and only 36% of hospitalists overall self-identified as White.[1]

"When you think of the demographics of actual working hospitalists, we could say the field of hospital medicine could and should do better in creating opportunities for diversity in leadership roles," Ms. Flores said.

Reference

1. Martin KL. Hospitalist compensation report for 2019. Medscape. 2019 Jun 5. https://www.medscape.com/slideshow/2019-compensation-hospitalist-6011429#3.

More data needed to better understand COVID-19 skin manifestations

By Jeff Craven
MDedge News

An erythematous rash was the most common cutaneous manifestation in patients with COVID-19, followed by chilblain-like lesions and urticaria-like lesions in a systematic review of mostly European studies.

Qing Zhao, MD, Xiaokai Fang, MD, and their colleagues at the Shandong Provincial Hospital for Skin Diseases & Shandong Provincial Institute of Dermatology and Venereology, in Jinan, China, reported the results of a literature review of 44 articles published through May 2020 that included 507 patients with cutaneous manifestations of COVID-19. The review was published in the Journal of The European Academy of Dermatology and Venereology.


Dr. Femia

Nearly all of the patients (96%) were from Europe, and more than half were women (60%), with an average age of 49 years. Most patients had multiple skin symptoms, with the most common being erythema (44%), chilblain-like lesions (20%), urticaria-like lesions (16%), vesicular manifestations (13%), livedo/necrosis (6%), and petechiae (almost 2%). The authors described erythema as being present in specific sites, such as the trunk, extremities, flexural regions, face, and mucous membranes. Slightly less than half of all patients had significant pruritus.

Data on systemic COVID-19 symptoms were available for 431 patients and included fever in about two-thirds of patients and cough in almost 70%, with dyspnea in almost half of patients. Almost 60% had fatigue, and almost 60% had asthenia. Information about the onset of skin symptoms was available in 88 patients; of these patients, lesions were seen an average of almost 10 days after systemic symptoms appeared and, in almost 15%, were the first symptoms noted.

Histopathologic exams were done for only 23 patients and, in all cases, showed "inflammatory features without specific pathological changes, such as lymphocyte infiltration." In one study, reverse transcription polymerase chain reaction testing of skin biopsy specimens tested negative for SARS-CoV-2.

Expression of ACE2, the receptor of SARS-CoV-2, in the skin was evaluated in six of the studies. "Higher ACE2 expression was identified in keratinocytes, mainly in differentiating keratinocytes and basal cells compared to the other cells of skin tissues," the authors wrote. These results were confirmed with immunohistochemistry, which, they said, found "ACE2-positive keratinocytes in the stratum basal, the stratum spinosum, and the stratum granulosum of epidermis." They added that this provides evidence "for percutaneous infection or the entry of virus into patients through skin tissues," but cautioned that more research is needed.

The authors acknowledged that there are still many unanswered questions about COVID-19, and that more clinical data and research are needed, to improve the understanding of the cutaneous manifestations associated with COVID-19.

In an interview, Alisa N. Femia, MD, director of inpatient dermatology in the department of dermatology at New York University, said that the cutaneous signs described in the review align well with what she has seen in patients with COVID-19.

> *"I think we are far away from drawing that conclusion, that one could touch a surface or a person who has COVID and contract it through their skin."*

At this point, it is unclear whether cutaneous manifestations of COVID-19 are a result of SARS-CoV-2 invading the skin or an immune response related to SARS-CoV-2, noted Dr. Femia, who was not involved in the research. One method of entry could be through transmitting virus present on the skin to another part of the body where infection is more likely.

> *"In terms of systemic invasion through the skin, it is possible, but this study certainly doesn't show that. The presence/expression of ACE2 in the epidermis doesn't translate to route of infection."*

While it is possible COVID-19 could be contracted through the skin, she noted, it is much more likely an individual would be infected by SARS-CoV-2 through more traditionally understood means of transmission, such as through respiratory droplets in person-to-person contact. "I think we are far away from drawing that conclusion, that one could touch a surface or a person who has COVID and contract it through their skin," Dr. Femia said. "The skin has a lot of other ways to protect against that from occurring," she added.

"SAR-CoV-2 obviously enters through the ACE2 receptor, which is fairly ubiquitous, and it has been seen in keratinocytes," she said. "But the skin is one of our biggest barriers ... and further, studies to date have shown that that receptor is expressed in relatively low levels of the keratinocytes."

Pathogenesis of different cutaneous manifestations may be different, Dr. Femia said. For example, urticaria and morbilliform eruption were described by the authors of the review as more benign eruptions, but pathogenesis may differ from that of so-called COVID toes and from the pathogenesis of purpura and ulcerations seen in patients with more severe disease, she noted. It is plausible, she added, that purpura and ulcerations may be a "direct invasion of SARS-CoV-2 into endothelial cells," which creates secondary processes "that ultimately destroy the skin."

Urticaria and morbilliform eruptions, on the other hand, show "more simply that the immune system is recognizing COVID, and in doing so, is also recognizing some antigens in the skin and creating a hypersensitive response to the skin" and has "nothing to do with the SARS-CoV-2 virus actually being in that location," she said.

It is important to differentiate between patients who have skin manifestations attributed to COVID-19 and those with manifestations independent of COVID-19, which is difficult, Dr. Femia noted. A patient with COVID-19 and a cutaneous manifestation may be having a reaction to a medication. "It's important to have a critical eye and to remember that, when we see these manifestations, we should always be investigating whether there was an alternative cause so that we can better learn what exactly we should be attributing to this infection," she said


Dr. Friedman

Adam Friedman, MD, professor and interim chair of dermatology at George Washington University, Washington, said the authors of the review had presented interesting work, but made some "assumptions that need to be proven." Dr. Friedman also was not involved in the research, but agreed in an interview with the assessment that it is unlikely SARS-CoV-2 would penetrate the skin. While some viruses – such as the poxvirus that causes molluscum contagiosum and the herpes simplex virus – invade keratinocytes specifically, there is a particular clinical phenotype that results that is associated with changes in the epidermis. However, "the skin manifestations of COVID-19 do not fit with direct skin invasion, [but] rather the immune response to systemic disease," he said.

"In terms of systemic invasion through the skin, it is possible, but this study certainly doesn't show that. The presence/expression of *ACE2* in the epidermis doesn't translate to route of infection," Dr. Friedman said..

The study received financial support from Shandong First Medical University, the Innovation Project of Shandong Academy of Medical Sciences, and the Shandong Province Taishan Scholar Project. The authors report no relevant financial disclosures. Dr. Femia and Dr. Friedman had no relevant financial disclosures.

Does metformin reduce risk for death in COVID-19?

By Miriam E. Tucker

Accumulating observational data suggest that metformin use in patients with type 2 diabetes might reduce the risk for death from COVID-19, but the randomized trials needed to prove this are unlikely to be carried out, according to experts.

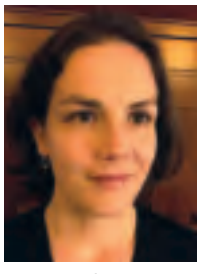
The latest results, which are not yet peer reviewed, were published online July 31 (medRxiv. doi: 10.1101/2020.07.29.20164020). The study was conducted by Andrew B. Crouse, PhD, of the Hugh Kaul Precision Medicine Institute, University of Alabama at Birmingham, and colleagues.

The researchers found that, among more than 600 patients with diabetes and COVID-19, use of metformin was associated with a nearly 70% reduction in mortality after adjustment for multiple confounders.

Data from four previous studies that also show a reduction in mortality among metformin users compared to nonusers were summarized by André J. Scheen, MD, PhD, in Diabetes and Metabolism (doi: 10.1016/j.diabet.2020.07.006).

Dr. Scheen, of the division of diabetes, nutrition, and metabolic disorders at Liège (Belgium) University, discussed possible mechanisms behind this observation.

"Because metformin exerts various effects beyond its glucose-lowering action, among which are anti-inflammatory effects, it may be speculated that this biguanide might positively influence the prognosis of patients with [diabetes] hospitalized for COVID-19," he said.


Dr. Lipska

"However, given the potential confounders inherently found in observational studies, caution is required before drawing any firm conclusions in the absence of randomized controlled trials," Dr. Scheen wrote.

Indeed, when asked to comment, endocrinologist Kasia Lipska, MD, of Yale University, New Haven, Conn., said in an interview: "Metformin users tend to do better in many different settings with respect to many different outcomes. To me, it is still unclear whether metformin is truly a miracle drug or whether it is simply used more often among people who are healthier and who do not have contraindications to its use."

She added, "I don't think we have enough data to suggest metformin use for COVID-19 mitigation at this point."

In the retrospective analysis of electronic health records from their institution, Dr. Crouse and colleagues reviewed data from 604 patients who were confirmed to have tested positive for COVID-19 between Feb. 25 and June 22, 2020. Of those individuals, 40% had diabetes.

Death occurred in 11% (n = 67); the odds ratio for death among those with, vs. without, diabetes was 3.62 ($P < .0001$).

Of the 42 patients with diabetes who died, 34 (81%) had used metformin, and eight (19%) had not, a significant difference (OR, 0.38; $P = .0221$). "In fact, with 11% [being] the mortality of metformin users, [this] was comparable to that of the general COVID-19–positive population and dramatically lower than the 23% mortality observed in subjects with diabetes and not on metformin," the authors said.

But, Dr. Lipska pointed out, "Observational studies can take into account confounders that are measured. However, unmeasured confounders may still affect the conclusions of these studies. ... Propensity score matching to account for the likelihood of use of metformin could be used to better account for differences between metformin users and nonusers."

A version of this article originally appeared on Medscape.com.

Men occupy most leadership roles in medicine

'Meritocracy only works if the initial playing field was level'

By Ted Bosworth
MDedge News

Since the early 2000s, approximately half of medical students in the United States – and in many years, more than half – have been women, but the proportion of women occupying leadership roles in medicine remains low, according to an update provided at the virtual Pediatric Hospital Medicine annual conference.

In pediatrics, a specialty in which approximately 70% of physicians are now women, there has been progress, but still less than 30% of pediatric department chairs are female, said Vincent Chiang, MD, chief medical officer of Boston Children's Hospital, during a presentation at the virtual meeting sponsored by the Society of Hospital Medicine, the American Academy of Pediatrics, and the Academic Pediatric Association.

Citing published data and a survey he personally conducted of the top children's hospitals identified by the U.S. News and World Report, Dr. Chiang said a minority of division chiefs, chief medical officers, chief financial officers, and other leaders are female. At his institution, only 2 of 16 division chiefs are female.

"No matter how you slice it, women are underrepresented in leadership positions," he noted.

The problem is certainly not confined to medicine. Dr. Chiang cited data showing that women and men have reached "near parity" in workforce participation in the United States even though the 20% earnings gap has changed little over time.

According to 2020 data from the World Economic Forum, the United States ranked 51 for the gender gap calculated on the basis of economic, political, educational, and health attainment. Even if this places the United States in the top third of the rankings, it is far behind Iceland and the Scandinavian countries that lead the list.

Efforts to reduce structural biases are part of the fix, but Dr. Chiang cautioned that fundamental changes might never occur if the plan is to wait for an approach based on meritocracy. He said that existing structural biases are "slanted away from women," who are not necessarily granted the opportunities that are readily available to men.


Dr. Chiang

"A meritocracy only works if the initial playing field was level. Otherwise, it just perpetuates the inequalities," he said.

The problem is not a shortage of women with the skills to lead. In a study by Zenger/Folkman, a consulting company that works on leadership skill development, women performed better than men in 16 of 18 leadership categories, according to Dr. Chiang.

"There is certainly no shortage of capable women," he noted.

Of the many issues, Dr. Chiang highlighted two. The first is the challenge of placing women on leadership pathways. This is likely to require proactive strategies, such as fast-track advancement programs that guide female candidates toward leadership roles.

The second is more nuanced. According to Dr. Chiang, women who want to assume a leadership role should think more actively about how and who is making decisions at their institution so they can position themselves appropriately. This is nuanced because "there is a certain amount of gamesmanship," he said. The rise to leadership "has never been a pure meritocracy."

Importantly, many of the key decisions in any institution involve money, according to Dr. Chiang. As a result, he advised those seeking leadership roles to join audit committees or otherwise take on responsibility for profit-and-loss management. Even in a nonprofit institution, "you need to make the numbers work," he said, citing the common catchphrase: "No margin, no mission."

However, Dr. Chiang acknowledged the many obstacles that prevent women from working their way into positions of leadership. For example, networking is important, but women are not necessarily attracted or invited to some of the social engagements, such as golf outings, where strong relationships are created.

In a survey of 100,000 people working at Fortune 500 companies, "82% of women say they feel excluded at work and much of that comes from that informal networking," Dr. Chiang said. "Whereas 92% of men think they are not excluding women in their daily work."

There is no single solution, but Dr. Chiang believes that concrete structural changes are needed. Female doctors remain grossly underrepresented in leadership roles even as they now represent more than half of the workforce for many specialties. Based on the need for proactive approaches outlined by Dr. Chiang, it appears unlikely that gender inequality will ever resolve itself.

Lisa S. Rotenstein, MD, who has written on fixing the gender imbalance in health care, including for the Harvard Business Review, said she agreed during an interview that structural changes are critical.

"In order to address current disparities, leaders should think about how to remove the formal and informal obstacles that prevent women and minorities from getting into the rooms where these decisions are being made," said Dr. Rotenstein, who is an instructor in medicine at Brigham and Women's Hospital, Harvard Medical School in Boston.

"This will need to involve sponsorship that gets women invited to the right committees or in positions with responsibility for profit-and-loss management," she added.

Dr. Rotenstein spoke about improving "access to the pipeline" that leads to leadership roles. The ways in which women are excluded from opportunities is often subtle and difficult to penetrate without fundamental changes, she explained.

"Institutions need to understand the processes that lead to leadership roles and make the changes that allow women and minorities to participate," Dr. Rotenstein said. It is not enough to recognize the problem.

Like Dr. Chiang, she noted that changes are needed in the methods that move underrepresented groups into leadership roles.

MIS-C is a serious immune-mediated response to COVID-19 infection

Patient care requires flexibility

By Ted Bosworth
MDedge News

One of the take-away messages from a review of multisystem inflammatory syndrome in children (MIS-C) is that clinicians treating this condition "need to be comfortable with uncertainty," Melissa Hazen, MD, said at a synthesis of multiple published case series and personal experience summarized at the virtual Pediatric Hospital Medicine annual conference.

She emphasized MIS-C patient care "requires flexibility," and she advised clinicians managing these patients to open the lines of communication with the many specialists who often are required to deal with complications affecting an array of organ systems.

MIS-C might best be understood as the most serious manifestation of an immune-mediated response to COVID-19 infection that ranges from transient mild symptoms to the life-threatening multiple organ involvement that characterizes this newly recognized threat. Although "most children who encounter this pathogen only develop mild disease," the spectrum of the disease can move in a subset of patients to a "Kawasaki-like illness" without hemodynamic instability and then to MIS-C "with highly elevated systemic inflammatory markers and multiple organ involvement," explained Dr. Hazen, an attending physician in the rheumatology program at Boston Children's Hospital.

A reliable profile of MIS-C is only beginning to emerge from the series of published case series, most of which have only recently reached publication, according to Dr. Hazen. In general, the description of the most common symptoms and their course has been relatively consistent.

In 186 cases of MIS-C collected in a study funded by the Centers for Disease Control and Prevention, 148 (80%) were admitted to intensive care, 90 patients (48%) received vasoactive support, 37 (20%) received mechanical ventilation, and 4 (2%) died.[1] The median age was 8 years (range, 3-13 years) in this study. The case definition was fever for at least 24 hours, laboratory evidence of inflammation, multisystem organ involvement, and evidence of COVID-19 infection. In this cohort of 186 children, 92% had gastrointestinal, 80% had cardiovascular, 76% had hematologic, and 70% had respiratory system involvement.

In a different series of 95 cases collected in New York State, 79 (80%) were admitted to intensive care, 61 (62%) received vasoactive support, 10 (10%) received mechanical ventilation, 4 (4%) received extracorporeal membrane oxygenation (ECMO), and 2 (2%) died.[2] Thirty-one percent of patients were aged 0-5 years, 42% were 6-12 years, and 26% were 13-20 years of age. In that series, for which the case definition was elevation of two or more inflammatory markers, or virologic evidence of COVID-19 infection, 80% had gastrointestinal system involvement, and 53% had evidence of myocarditis.

In both of these series, as well as others published and unpublished, the peak in MIS-C cases has occurred about 3-4 weeks after peak COVID-19 activity, according to Diana Lee, MD, a pediatrician at Icahn School of Medicine at Mount Sinai, New York. This pattern, reported by others, was observed in New York State, where 230 cases of MIS-C were collected from the beginning of May until the end of June, which reflected this 3- to 4-week delay in peak incidence.

Clinicians managing MIS-C patients should communicate with specialists who deal with complications affecting an array of organ systems.

"This does seem to be a rare syndrome since this [group of] 230 cases is amongst the entire population of children in New York State. So, yes, we should be keeping this in mind in our differential, but we should not forget all the other reasons that children can have a fever," she said.

Both Dr. Hazen and Dr. Lee cautioned that MIS-C, despite a general consistency among published studies, remains a moving target in regard to how it is being characterized. In a 2-day period in May, the CDC, the World Health Organization, and New York State all issued descriptions of MIS-C, employing compatible but slightly different terminology and diagnostic criteria. Many questions regarding optimal methods of diagnosis, treatment, and follow-up remain unanswered.

Questions regarding the risk to the cardiovascular system, one of the organs most commonly affected in MIS-C, are among the most urgent. It is not now clear how best to monitor cardiovascular involvement, how to intervene, and how to follow patients in the postinfection period, according to Kevin G. Friedman, MD, a pediatrician at Harvard Medical School, Boston, and an attending physician in the department of cardiology at Boston Children's Hospital.

"The most frequent complication we have seen is ventricular dysfunction, which occurs in about half of these patients," he reported. "Usually it is in the mild to moderate range, but occasionally patients have an ejection fraction of less than 40%."

Coronary abnormalities, typically in the form of dilations or small aneurysms, occur in 10%-20% of children with MIS-C, according to Dr. Friedman. Giant aneurysms have been reported.

"Some of these findings can progress including in both the acute phase and, particularly for the coronary aneurysms, in the subacute phase. We recommend echocardiograms and EKGs at diagnosis and at 1-2 weeks to recheck coronary size or sooner if there are clinical indications," Dr. Friedman advised.

Protocols like these are constantly under review as more information becomes available. There are as yet no guidelines, and practice differs across institutions, according to the investigators summarizing this information.

None of the speakers had any relevant financial disclosures.

Irina Shatilova/Getty Images

References

1. Feldstein LR et al. Multisystem inflammatory syndrome in U.S. children and adolescents. N Engl J Med. 2020;383:334-46.

2. Dufort EM et al. Multisystem inflammatory syndrome in children in New York State. N Engl J Med. 2020;383:347-58.

Parental refusal of neonatal therapy a growing problem

Encourage a 'presumptive approach'

By Ted Bosworth
MDedge News

Parents who refuse one indicated neonatal preventive therapy often refuse others even when the reasons are different, according to an update at the virtual Pediatric Hospital Medicine annual conference. This finding indicates the value of preparing policies and strategies to guide parents to appropriate medical decisions in advance.

"Elimination of nonmedical exceptions to vaccinations and intramuscular vitamin K made it into two of the AAP [American Academy of Pediatrics] top 10 public health resolutions, most likely because refusal rates are going up," reported Ha N. Nguyen, MD, of the division of pediatric hospital medicine at Stanford (Calif.) University.

Importantly, state laws differ. For example, erythromycin ointment is mandated in neonates for prevention of gonococcal ophthalmia neonatorum in many states, including New York, where it can be administered without consent, according to Dr. Nguyen. Conversely, California does not mandate this preventive therapy even though the law does not offer medico-legal protection to providers if it is not given.


Dr. Nguyen

"There is a glaring gap in the way the [California] law was written," said Dr. Nguyen, who used this as an example of why protocols and strategies to reduce risk of parental refusal of neonatal therapies should be informed by, and consistent with, state laws.

Because of the low levels of vitamin K in infants, the rate of bleeding within the first few months of life is nearly 2%, according to figures cited by Dr. Nguyen. It falls to less than 0.001% with administration of intramuscular vitamin K.

Families who refuse intramuscular vitamin K often state that they understand the risks, but data from a survey Dr. Nguyen cited found this is not necessarily true. In this survey, about two-thirds knew that bleeding was the risk, but less than 20% understood bleeding risks included intracranial hemorrhage, and less than 10% were aware that there was potential for a fatal outcome.

"This is a huge piece of the puzzle for counseling," Dr. Nguyen said. "The discussion with parents should explicitly involve the explanation that the risks include brain bleeds and death."

Although most infant bleeds attributed to low vitamin K stores are mucocutaneous or gastrointestinal, intracranial hemorrhage does occur, and these outcomes can be devastating. Up to 25% of infants who experience an intracranial hemorrhage die, while 60% of those who survive have some degree of neurodevelopmental impairment, according to Dr. Nguyen.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Oral vitamin K, which requires multiple doses, is not an appropriate substitute for the recommended single injection of the intramuscular formulation. The one study that compared intramuscular and oral vitamin K did not prove equivalence, and no oral vitamin K products have been approved by the Food and Drug Administration, Dr. Nguyen reported.

> *"This is a huge piece of the puzzle for counseling. The discussion with parents should explicitly involve the explanation that the risks include brain bleeds and death."*

> *"One reason that many parents refuse the hepatitis B vaccine is that they do not think their child is at risk. ... The AAP supports universal hepatitis B vaccine within 24 hours of birth for all infants over 2,000 g."*

"We do know confidently that oral vitamin K does often result in poor adherence," she said,

In a recent review article by Loyal et al. of parental vitamin K refusal, one of the most significant predictors of refusal of any recommended neonatal preventive treatment was refusal of another (Hosp Pediatr. 2020;10:286-294). According to data in that article, summarized by Dr. Nguyen, 68% of the parents who declined intramuscular vitamin K also declined erythromycin ointment, and more than 90% declined hepatitis B vaccine.

"One reason that many parents refuse the hepatitis B vaccine is that they do not think their child is at risk," explained Kimberly Horstman, MD, from Stanford University and John Muir Medical Center in Walnut Creek, Calif.

Yet hepatitis B virus (HBV) infection, which is asymptomatic, can be acquired from many sources, including nonfamily contacts, according to Dr. Horstman.

"The AAP supports universal hepatitis B vaccine within 24 hours of birth for all infants over 2,000 g at birth," Dr. Horstman said. In those weighing less, the vaccine is recommended within the first month of life.

The risk of parental refusal for recommended neonatal preventive medicines is higher among those with more education and higher income relative to those with less, Dr. Nguyen said. Other predictors include older maternal age, private insurance, and delivery by a midwife or at a birthing center.

Many parents who refuse preventive neonatal medications do not fully grasp what risks they are accepting by avoiding a recommended medication, according to both Dr. Nguyen and Dr. Horstman. In some cases, the goal is to protect their child from the pain of a needlestick, even when the health consequences might include far more invasive and painful therapies if the child develops the disease the medication would have prevented.

In the case of intramuscular vitamin K, "we encourage a presumptive approach," Dr. Nguyen said. Concerns can then be addressed only if the parents refuse.

For another strategy, Dr. Nguyen recommended counseling parents about the need and value of preventive therapies during pregnancy. She cited data suggesting that it is more difficult to change the minds of parents after delivery.


Dr. Horstman

Echoing this approach in regard to HBV vaccine, Dr. Horstman suggested encouraging colleagues, including obstetricians and community pediatricians, to raise and address this topic during prenatal counseling. By preparing parents for the recommended medications in the prenatal period, concerns can be addressed in advance.

The health risks posed by parents who refuse recommended medications is recognized by the Centers for Disease Control and Prevention. Both Dr. Horstman and Dr. Nguyen said there are handouts from the CDC and the AAP to inform parents of the purpose and benefit of recommended preventive therapies, as well as to equip caregivers with facts for effective counseling.

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COVID-19 pandemic driving huge declines in pediatric service revenue

Pediatric caregivers should consider options

By Ted Bosworth
MDedge News

The rapid decline in pediatric hospital visits that came quickly after COVID-19 has emerged as a major public health threat, creating the need for adaptations among those offering hospital-based care, according to an objective look at patient numbers that was presented at the virtual Pediatric Hospital Medicine annual conference.


Dr. Dias

"Pre-COVID, operating margins had already taken a significant decline – and there are lots of different reasons for why this was happening – but a lot of hospitals in the United States were going from seeing about a 5% operating margin to closer to 2%-3%," said Magna Dias, MD, medical director, pediatric inpatient services, at Yale New Haven Children's Hospital, Bridgeport, Conn.

This nearly 50% decline "was already putting pressure on us in the community hospital setting where pediatrics is not necessarily generating a ton of revenue to justify our programs, but post COVID, our operating revenue – and this is a report from May – was down 282%," Dr. Dias reported.

Dr. Dias said that hundreds of hospitals have furloughed workers in the United States since the pandemic began. Although the job losses are not confined to pediatric care, statistics show that pediatrics is one of the hardest hit specialties.

"Looking specifically at ED [emergency department] visits under age 14, one study showed a 71%-72% decrease post COVID," Dr. Dias said. This included a 97% reduction in ED visits for flu and more than an 80% reduction in visits for asthma, otitis media, and nausea or vomiting.

It is not clear when children will return to the hospital in pre–COVID-19 numbers, but it might not be soon if the a second wave of infections follows the first, according to Dr. Dias. She suggested that pediatric hospitalists should be thinking about how to expand their services.

"One thing we are really good at in terms of working in the community hospital is diversification. We are used to working in more than one area and being flexible," Dr. Dias said. Quoting Charles Darwin, who concluded that adaption to change predicts species survival, Dr. Dias advised pediatric hospitalists to look for new opportunities.

Taking on a broader range of responsibilities will not be a significant leap for many pediatric hospitalists. In a survey conducted several years ago by the American Academy of Pediatrics, hospital staff pediatricians were associated with activities ranging from work in the neonatal intensive care unit to primary ED coverage, according to Dr. Dias. Now with declining patient volumes on pediatric floors, she foresees an even greater expansion, including the care of young adults.

One organization formed in response to the COVID-19 pandemic, called the Pediatric Overflow Planning Contingency Response Network (POPCoRN) has been taking a lead in guiding the delivery of adult care in a pediatric environment.

> *"One thing we are really good at in terms of working in the community hospital is diversification. We are used to working in more than one area and being flexible."*

As a cochair of a community hospital special-interest group within POPCoRN, Dr. Dias said she has participated in these discussions.

"At some centers, they have gone from age 18 to 21, some have gone up to age 25, some have gone up to 30 years," she said.

Many centers are working to leverage telemedicine to reach pediatric patients no longer coming to the hospital, according to Dr. Dias.


DOOMU/THINKSTOCK

"There are a lot of people being very creative in telemedicine," she said. While it is considered as one way "to keep children at your institution," Dr. Dias said others are considering how telemedicine might provide new opportunities. For one example, telemedicine might be an opportunity to deliver care in rural hospitals without pediatric services.

In an AAP survey of pediatric hospitalists conducted several years ago, justifying services was listed as the second most important concern right after access to subspecialty support. Because of COVID-19, Dr. Dias expects the order of these concerns to flip. Indeed, she predicted that many pediatric hospitalists are going to need to reassess their programs.

"We have started looking at what are our opportunities for building back revenue as well as how to recession-proof our practices should there be another surge and another decrease in pediatric volume," Dr. Dias said.

The changes in pediatric care are not confined to the hospital setting. According to Amy H. Porter, MD, assistant professor of pediatrics at the Kaiser Permanente Bernard J. Tyson School of Medicine, Pasadena, Calif., COVID-19 has "changed the way pediatric medicine is being practiced."

Although she works in outpatient pediatric care, she said that routine care "is way down" in this setting as well. Like Dr. Dias, she has witnessed a major increase in the use of telemedicine to reach pediatric patients, but she is very concerned about the large proportion of children who are missing routine care, including vaccinations.

"We were already seeing outbreaks of whooping cough and measles pre COVID, so we are quite worried that we will see more," Dr. Porter said.

A reduction in demand for care does not have the same immediate effect on revenue at a large health maintenance organization like Kaiser Permanente, but growing unemployment in the general population will mean fewer HMO members. In turn, this could have an impact on the entire system.

"When membership goes down, then it will have implications for how we can provide services," Dr. Porter said.

In the meantime, social workers at Kaiser Permanente "are tirelessly working" to help parents losing benefits to obtain medicines for sick children with chronic diseases, according to Dr. Porter. She echoed the comments of Dr. Dias in predicting major changes in pediatric care if the COVID-19 pandemic and its economic consequences persist.

The conference was sponsored by the Society of Hospital Medicine, the American Academy of Pediatrics, and the Academic Pediatric Association.

Common incidental findings found on pediatric imaging

By Marc R. Miller, MD, FAAP

PHM20 session title

The Incidentaloma: Common Incidental Findings Seen on Pediatric Imaging

Presenters

Jill Azok, MD; Amanda Lansell, MD; Allayne Stephans, MD; and Erin Frank, MD

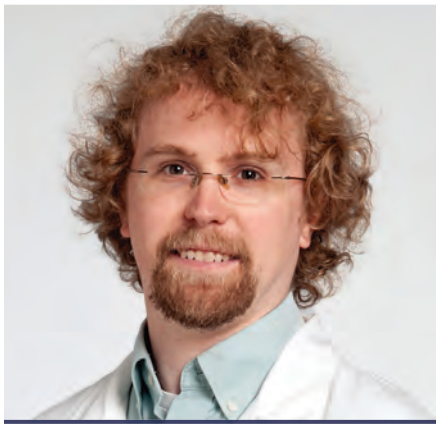
Session summary

Dr. Azok, Dr. Lansell, and Dr. Frank of University Hospitals Rainbow Babies & Children's Hospital, Cleveland, described one to three common, incidentally noted findings in central nervous system, thoracic, abdominopelvic, and musculoskeletal imaging. The presenters explained the indications for further work-up and/or intervention of these findings, and the importance of judicious use of imaging in pediatric patients.

Dr. Frank discussed incidental findings seen on imaging of the central nervous system, using cases to focus on benign enlargement of the subarachnoid space, lipomas of the filum terminale, and pituitary abnormalities. Dr. Lansell continued by discussing possible clinical models for management of incidentally found pulmonary nodules and renal cysts. Dr. Azok completed the session with a discussion of the appearance and management of nonossifying fibromas and cortical fibrous defects. Common threads shared by all presenters were how frequent incidental findings are and the need for providers to be comfortable with a level of uncertainty.

Key takeaways

- Incidental findings are very common in pediatric imaging, occurring on up to one-third of CT scans, 25% of brain MRIs, and 21% of knee radiographs.
- An infant with personal and family history of macrocephaly, normal development, and increased extra-axial CSF on MRI likely has benign enlargement of the arachnoid space and does not need further evaluation.
- A hyperintensity of filum terminale on MRI is consistent with lipoma of the filum terminale and does not require follow-up unless symptoms of tethered cord are present.
- Pituitary abnormalities are common and call for dedicated history, physical exam, and an endocrine screening with imaging surveillance if screening is normal.
- Patient history and appearance of pulmonary nodules are important in determining appropriate follow-up.
- No single feature of renal lesions predicts future behavior, but larger lesions deserve more work-up.
- Nonossifying fibromas are well-demarcated intracortical radiolucencies of long bone metaphyses that do not require treatment or further evaluation unless they are large, painful, or occur in the proximal femur.



Dr. Miller is a second-year pediatric hospital medicine fellow at Cleveland Clinic Children's. His academic interests include medical education, quality improvement, and high value care.

NYC public hospitals

Continued from page 1

mobilized palliative care volunteers, harnessed telemedicine and a clinician hotline, and made other sweeping changes to ensure that the city's public health system would be able to respond to demand at the peak of the surge. That peak hit in April, when an average of 9,000 new COVID-19 cases were being reported in the city every day.

Through it all, hospitalists have played critical roles in both planning for the system's response and caring for severely ill COVID-19 patients. Their stories reflect both the unprecedented demands on the system and the dedication of frontline clinicians.

Dr. Saladini-Aponte

One of those, Carla Saladini-Aponte, MD, who just finished her residency in June 2019, found herself on the firing line in March 2020 as an attending physician at 457-bed NYCH+H/Jacobi Hospital in the Bronx. "I have experienced so much in my first year on the job, dealing with a disease that we've never seen before," she said. "We didn't grasp the extent of the COVID crisis in the beginning, so we were emotionally unprepared when it first hit."

Starting on March 30, NYCH+H administration mobilized a centralized incident command structure to coordinate response systemwide to a rapidly changing situation.

Two weeks later Jacobi was a COVID-19 hospital, top to bottom, with its medical ICU beds increased from 12 to more than 100. By mid-April, Dr. Saladini-Aponte's team, 1 of 11 medical teams in the hospital, had 26 patients, all of them with COVID-19. There was not a consensus in the early days on how to manage patients with severe respiratory distress. "But by the time the surge came, we had a better understanding of the scope of the situation," she said.

Learning to be an attending

"They don't teach you how to be an attending during residency," Dr. Saladini-Aponte said. "At the beginning I wasn't such a good teacher. I just wanted to prove myself and stay one step ahead of the residents. But as an academic hospitalist you have to listen to others. I learned to ask questions of the residents every morning, including how they were doing personally."

Sometimes a visiting consultant would ask on the floor: "'Where's your attending?'" not recognizing Dr. Saladini-Aponte, fresh out of residency, filling that role. At times, she felt like a PGY-4 (postgraduate year 4). But she quickly grew into the attending role and was asked to be site coordinator for the mobilization of palliative medicine volunteers at Jacobi.

"We found ourselves having to make tough ethical decisions. Some patients, even if we provided a ventilator and maximum oxygen therapy, would still die. There were difficult discussions when we didn't know if we had enough dialysis machines, or how to manage other limited resources. The hospital was saying: You decide, if there's a high degree of certainty about the outcome. But we had never practiced medicine this way before," she said.

"That's why our hospital provided daily ethics meetings with our ethics council. There would be eight people sitting 6 feet apart in a conference room, all wearing masks. We'd talk about situations that were giving us trouble. Their role wasn't to provide answers but to help us see the scope of the situation and the complexities," she explained.

> *"As an academic hospitalist you have to listen to others. I learned to ask questions of the residents every morning, including how they were doing personally."*

Dr. Saladini-Aponte said she has had many sleepless nights since the pandemic began. "Sometimes, I would come home from work and lie down on the floor and cry," she said. "But we had so much support from volunteers helping our little hospitalist service of seven." It was also important to keep up with the clinical information, and one of her coworkers created "cheat sheets" for the clinicians, regularly updated with the latest essential information on antibiotics, testing, and the like.

> *"We were truly at the epicenter of the pandemic. All of our hospitals had different experiences, and unique responses. But the system worked well."*

"At the peak, I was trying to read everything I could about the virus. I was just pulling myself in too many directions. I asked for help from my boyfriend to remind me not to log onto my computer when I came home from work," she said. "One of my techniques for preventing burnout was just to avoid social media. I couldn't deal with what was going on in the news. It just angered me. Even now, seeing people without masks makes me very uncomfortable."

Organizing the crisis response

As chief value officer for NYCH+H, Hyung (Harry) Cho, MD, FACP, SFHM, typically focuses on issues of patient safety and overuse of medical treatments in the health system. But in the COVID-19 crisis, he found himself at the forefront of organizing its response. "We tried to provide support centrally and to standardize practice in how we test and treat," he said.

"We were truly at the epicenter of the pandemic," Dr. Cho said. "All of our hospitals had different experiences, and unique responses. But the system worked well." Patients were transferred from the more overtaxed hospitals to Bellevue and other NYCH+H hospitals with spare beds. An emergency medical response structure was put in place, and every morning the system's Tiger Team, with multidisciplinary personnel from administration, operations, logistics, and medical/technical specialists, would gather virtually to discuss needs across the system.

"It was a very open atmosphere and we asked people to report what was happening on the ground," Dr. Cho said. "We started rapidly reviewing batches of 20 patients at a time for transfer in order to alleviate pressure in the most overtaxed ERs."

NYCH+H also had to work through concerns about personal protective equipment (PPE), just like other U.S. hospitals. Treatment guidelines were changing by the day. Medical concerns were relayed at a rapid pace. Another priority was trying to limit unnecessary exposure for staff through a recommendation that only one clinician from a team would go into the room of an infected patient, unless another was absolutely needed.

Facing the reality of public health

NYCH+H was created by the New York State Legislature in 1969 and rebranded in 2015. It includes a low- to no-cost health insurance plan called MetroPlus, along with outpatient centers, comprehensive case management, and social supports in the home.

Dr. Cho

"What people know about public health systems is that we typically are underresourced. That's just the reality of public health," Dr. Cho said. "We help the community, the underserved. The people who truly needed our help are also the ones who have been disproportionately affected by COVID-19. And that is where we really shine as a system."

Dr. Cho lauded the performance of the health system's frontline staff. "Watching them come together during the entire pandemic, and do their best every day, was truly inspiring," he said. "But when they got to the peak, it really took an emotional toll on them."

NYCH+H's in-house staff support program, called Helping Healers Heal, was mobilized with specially trained teams at each of its 11 hospitals to provide peer-to-peer support, mental health expertise, and team-debriefing sessions to staff members following traumatic events. Support is provided both over the phone and in person on the floors, Dr. Cho said. "During the surge, everything was happening so quickly, there was no time to take a pause. Now, as we are able to catch our breath, that's when they most need support."

The hospitalists at NYCH+H hospitals intend-

IVAN68/GETTY IMAGES

ed to have goals-of-care conversations with all patients, but everyone was very busy – so having these conversations became harder and harder, Dr. Cho said. Recognizing limited staffing for the quadrupling of patients who needed palliative care at NYCH+H hospitals, he asked the medicine chairs about their palliative care needs and then used social media outreach to ask for help. The message went viral, attracting 413 volunteers from across the country. Sixty-seven telepalliative volunteers were put to work doing goals-of-care conversations remotely with inpatients and their families.[1]

Expediting transfers

For Ian Fagan, MD, a hospitalist and associate medical director for general internal medicine Inpatient Services at Bellevue Hospital in Manhattan, hospitalist shifts are a normal part of his job. But he had to give them up during the surge to focus on planning, managing, and especially scheduling other doctors, with sufficient backups needed to cover last-minute changes. Dr. Fagan did that by using the existing pool of hospitalist staff, physicians who were reassigned from other specialties, agency staff, military medical personnel, and volunteer doctors who flew in from around the country to help. He also worked 10- to 12-hour days for 36 consecutive days.

The impact of disparities in access to care in New York City was reflected in the greater demand for care in the hospitals in Brooklyn, Queens, and the Bronx. "With fewer patients and more hospital beds in Manhattan, we had the capacity to share our beds," Dr. Fagan said. "It was so amazing to me how quickly we could move patients from one hospital to another. We started accepting up to 40 transfers a day. But hey, we were still really busy."

Bellevue is the nation's oldest public hospital. "We care for the homeless, for immigrants, and we don't ask questions. That's our mission. I'm so proud to work here, and so grateful," Dr. Fagan said. "If someone is undocumented or without insurance, I will give them exactly the same care. We stepped up in a big way to care for people of New York, but we've always been there for them – and we were there for them during the COVID surge."

The hospitals in the system also worked together in ways Dr. Fagan had never seen. "It helped to have a central command structure with a bird's eye view from above the level of individual hospitals, to organize and see which hospitals could step up. It's good to have the data to put it in perspective," he said. The system also utilized a temporary low-acuity medical center set up by NYCH+H on Roosevelt Island, as well as field hospitals organized at the Jacob K. Javits Convention Center and the USTA Billie Jean King National Tennis Center.

"At Bellevue we tried to stay ready, with the ability to turn former hospital units that were being used as offices back to beds. We always had three units lined up that were fully ready to convert. For example, I was medical director of the preop clinic and one day they gave us 24 hours to pack everything and move out. Three days later, it was a 24-bed unit. We also built a more robust rapid response and code team," he said.

"It was hard for me not to take hospitalist shifts, because my identity is being a doctor. I eventually came to terms with the importance of the role that I was doing every day. I felt I could protect my colleagues, and if they were having an emotional day, to give them the opportunity to talk to someone. I also did the onboarding, one-on-one, of the new doctors."

"We care for the homeless, for immigrants, and we don't ask questions. That's our mission. I'm so proud to work here, and so grateful."

As the crisis in New York City has ebbed, Dr. Fagan was recently able to again take a week of clinical service. "The first day back on the floor I felt that I had forgotten everything. But by the end of the day, I thought, 'Okay, I do know how to do this, after all.' Census is down here. It's quiet. That's good. We need it now," he said.

"I think the hardest moment for me was when the head nurse on our trauma unit, Ernesto DeLeon, known to everybody here, died of COVID in our ICU in April," Dr. Fagan said. When Mr. DeLeon died, 100 hospital personnel gathered in the halls outside the room to pay their respects. "There had been a palpable fear in our lives – and this showed us that the fear was real. Ernesto was the first person I knew well who died, who acquired COVID at work doing what we're all doing. We haven't lost any doctors yet, but when this nurse died, we allowed ourselves to realize that this is personal. In that moment, we needed to allow ourselves to be human."

Joan Curcio, MD, associate director of medicine at Elmhurst Hospital, said Elmhurst was where the story started for New York City and for NYCH+H. "I trained here and have spent my entire career at this hospital. It came to feel like what a battleground must be like, with things coming at you from every direction," she said. "It was overwhelming in ways I could not have foreseen. I had seen videos from Italy [an early COVID-19 epicenter], but until it happened here, it was just hard to process."

Things started slowly, with a few patients with severe acute respiratory distress syndrome and a 5- to 7-day turnaround to get results of their viral infection tests. "By week 2, a greater number of patients from our clinics and testing sites were filtering through the emergency department. Then hundreds."

The normal occupancy rate for the department of medicine at Elmhurst is 110%-115%, which typically means full beds plus patients in the emergency department. "We started to grow to 160, then 180, and then a peak of 250% of occupancy. We took over a rehab surgery floor, then a 35-bed surgery and hospice floor, which went to full capacity just like that," she said. The number of non–critical care service teams increased to 20, working with redeployed staff, volunteers, military, and agency personnel, while ICU beds increased from 20 to 105.

"We were dealing with a much higher acuity level and enduring emotional turmoil with families, trying to carve out time to call them after our shift was over," Dr. Curcio explained. Elmhurst developed a call-in hotline and a daily call-out service for families. Technology was mobilized to provide video visits and new systems were designed for isolation and for PPE distribution and use.

Dr. Fagan

"I just felt that I couldn't get everything done. I felt continually overwhelmed, and it didn't matter how much time I took. I never felt I was able to give enough to anybody in any area, which was hard to take," Dr. Curcio said. "But I still felt a sense of purpose and that I was making a difference – thanks to lots of support from the central office."

Patient volume at Elmhurst is now down, lower than Dr. Curcio has ever seen it. "One of the main issues right now, moving forward, is 'how do we function in a post-crisis mode?' " she said. The process of transitioning back to non-COVID-19 care will be complex. "When we clear a floor and clean it to go back to being a cold [COVID-19-negative] unit, it's a whole different level of cleaning that takes 7 days."

One moment that was particularly jarring for Dr. Curcio occurred while she was giving a tour of the hospital to visiting military medical personnel. "We went into the emergency department and I turned around and looked into a shower room, which was full of body bags. They were all full."

But the experience has also been inspiring. "People gave their all without complaint. We hospitalists, and all those recruited to act as hospitalists, essentially took responsibility for the COVID response," she said. "This was, hopefully, the experience of a lifetime as a medical professional. I wouldn't want to ever experience something as daunting as this again."

Reference

1. Israilov S et al. National outreach of telepalliative medicine volunteers for a New York City safety net system COVID-19 pandemic response. J Pain Symptom Manag. 2020 May 29. doi: 10.1016/j.jpainsymman.2020.05.026.

Children's doctors in the world of adults

Pediatric hospitalists venture into COVID-19 adult care

By Mirna Giordano, MD

The memories I have from the few nights spent in the adult pop-up cardiac intensive care unit are pouring in as I sit down to tell this story. I am a pediatric hospitalist at Columbia University New York–Presbyterian Morgan Stanley Children's Hospital. I usually take care of sick, hospitalized children. However, in these extraordinary times, I have joined an army of colleagues taking care of adult patients with COVID-19.

Almost all these patients had tracheostomies connected to ventilators, as well as acute-on-chronic cardiac issues. They were often delirious and unable to speak, and always alone. I was happy to help our adult colleagues, but I was also afraid. I was scared to make a mistake that could be detrimental to my patient, even though I knew well that ICU residents, fellows, and attendings were just a phone call away.

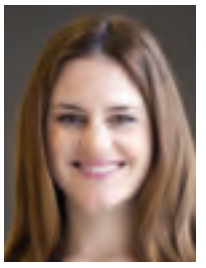
I felt like Alice in Wonderland, initially too small compared with her environment, and the next minute hunched, giant, and still clearly displaced. Except I was not dreaming or watching a movie. There was no white rabbit to chase. The situation was serious and emotionally challenging. I imagined that each patient was the dearest member of my family: my mother, my father, my aunt or uncle. I took pleasure in sharing smiles while asking the patients how they were feeling, and I touched their hands, even though much of my face was covered and there were gloves on my hands.

The year 2020 has been surreal. People have had to find their own way of pushing through the unknown and unexpected. For a start, I would never in a million years have imagined using phrases like pop-up ICU.[1] I was signing an admission note for a 90-year-old lady with acute-on-chronic congestive heart failure and acute respiratory hypoxemic failure and there, at the bottom of the note, was my name, followed by an odd remark: "pediatric hospital medicine." That is what happened in New York City in 2020: Many unexpected events took place.

This article represents a virtual conversation with three other pediatric hospitalists who, under different sets of circumstances, did the same thing: took care of adult patients. I hope that the answers to the questions I asked make you pause, reflect, and learn from the experiences described.

Would you describe the usual environment where you practice pediatric hospital medicine?

Julie Dunbar, MD: I am a full-time pediatric hospitalist at the Children's Hospital at Montefiore, a tertiary care academic children's hospital in the Bronx. A typical day on service involves staffing up to 14 patients, up to 21 years old, on a teaching service with residents and physician assistants. We normally staff the hospital in two shifts – day and evening – until 11:00 at night. We are situated at the heart of a medically underserved area, and our hospital system cares for about one-third of the total population of the Bronx.



Dr. Dunbar

L. Nell Hodo, MD: I work at Kravis Children's Hospital at the Mount Sinai Hospital, in Manhattan at the juncture of the Upper East Side and Harlem. Our usual hospital medicine environment is the general ward/floor in a nested children's hospital within an adult hospital. We have about 32 non-ICU beds, and the patients are managed by a combination of hospitalists, general pediatricians, and specialist attendings. All patients are on resident teams. We have a comanagement model in which the primary attending for surgical patients is always a pediatric attending (hospitalist or specialist).

Dr. Hodo

Avital M. Fischer, MD: New York–Presbyterian Morgan Stanley Children's Hospital is a quaternary care center – where children from the area receive subspecialty care – as well as, functionally, a community hospital for the Washington Heights area. Therefore, we always have an interesting mix of general pediatric inpatient medicine including patients with complex medical conditions, rare diseases, postoperative conditions, and undiagnosed illnesses on our wards. We are a children's hospital, connected to a larger adult hospital system. Pediatric hospitalists cover two pediatric wards, team-staffed by residents, and a progressive care unit, staffed by nurse practitioners. There is usually evening coverage until 11 p.m.

Dr. Fischer

How did this change when New York became the U.S. epicenter of the SARS-CoV-2 pandemic? Was the transition to taking care of adult patients gradual or sudden? Were you deployed to a different hospital or part of the hospital? How prepared did you feel?

Dr. Dunbar: We experienced the COVID-19 pandemic like much of the rest of New York City – it started as a slow and uncertain process, and then it hit us all at once. In initial conversations, like everyone else, we did not know exactly what was coming. We started with small changes like working from home on nonclinical days and canceling family-centered rounds to conserve personal protective equipment (PPE). In mid-March, we were still expecting that redeployment to adult floors was a highly unlikely scenario. We made work-from-home schedules and planned projects we would work on while social distancing. We planned journal clubs about emerging evidence on COVID-19. However, things happened fast, and many of these plans were scrapped.

On Saturday, March 28, we closed the main floor of the children's hospital because so few pediatric patients were being admitted. Two days later, we admitted our first cohort of adult COVID-19 patients, all more than 30 years old. They were transferred en masse from an outside hospital emergency depart-

ment that desperately needed our beds. They arrived all at once, and they all required respiratory support. At the last hospitalist division meeting before the adults arrived, we had time for only one priority set of information, and so we chose end-of-life care. We reviewed scripts for advance care planning and logistics of death certificates. As fast as things changed for us, they changed even faster for the patients. Most were relatively healthy people who rather suddenly found themselves isolated, on oxygen, dictating their final wishes to pediatricians in full protective gear. Many, many patients got better, and of course, several spent their last moments with us. One physician assistant, who works closely with the hospitalists, spent the last 5 hours of an elderly patient's life holding her hand and helping her FaceTime with family.

For the most part, the patients came to us. We worked with our own colleagues and our own nurses, on our own territory. A few of my colleagues were briefly redeployed to a series of conference rooms that were used for several weeks as overflow space for more stable COVID-19 patients. Staffing by the pediatrics teams was so robust, with willing volunteers from every corner of the children's hospital, that we were not needed for long.

During the early days, there was no clinical pathway to follow to care for COVID-19 patients – it didn't exist for this novel and variable disease. We created a platform to share documents and resources in real time as they became available to us. We used group texts and emails to learn from our experiences and encourage one another. Importantly, no one was afraid to ask for help, and we relied on our adult colleagues when patients started to decompensate. Adult critical care came to our aid for all rapid responses for patients older than 30. Pediatric critical care, in their infinite flexibility, was responsible for anyone younger.

Dr. Hodo: We had a variety of changes. The first thing was the deployment of many of our attendings (hospital medicine, ICU, outpatient, and subspecialists) and residents to the adult side to work on medical COVID-19 units or in the many ICUs (some new "pop-up" units in former medical units, postanesthesia care units, and so on).[2] On the adult floor we had "COVID teams," which had an attending and two frontline providers; one of these three people was an internal medicine faculty member or resident. Residents from other specialties (emergency medicine, family medicine) were pulled off pediatric assignments in pediatric wards, PICUs, and EDs, so pediatric residents not originally assigned to inpatient rotations were sent to cover these core pediatric areas. The remaining pediatric faculty backfilled the pediatric services – so the remaining ICU docs did more shifts to cover ICU; the undeployed specialists took more inpatient service or clinic time, and so on. Outpatient pediatrics covered the inpatient pediatric service for the 3 weeks when most of the hospitalists were deployed.

"During the early days, there was no clinical pathway to follow to care for COVID-19 patients – it didn't exist for this novel and variable disease."

We had one pediatric unit, which was a unit with equipment that made it capable of having ICU patients or floor patients, that was designated a COVID-19 unit. Most COVID-19 patients were there. Some were also in negative-pressure rooms on other floors or in the unit directly above the COVID-19 unit. Some adult patients came to the unit in the pediatric hospital but not as many as initially expected, and most were young adults in their 20s. So rather than adult patients coming to pediatrics, our experience was more that pediatricians went to the adult side.

The transition to adult care for physicians was variable in its suddenness. Most people had at least 48 hours' notice, whereas some had as much as a week. Most of our department members deployed within the hospital complex of which we are a part, though a few went to other sites in the health system. Some were deployed into administrative or support roles in the system, rather than patient-facing roles. I felt, I would say, reasonably prepared. I trained in family medicine, though I have been exclusively in pediatrics for the past 7 years. I felt rusty, for sure, but perhaps not quite as out of my element as others. In preparation, I read a lot about COVID, reviewed some adult medicine topics provided by the medicine department, used the resources on the Pediatric Overflow Planning Contingency Response Network (POPCoRN), including an Advanced Cardiac Life Support review, and was able to shadow on a COVID-19 unit before I actually started – that was incredibly helpful. I also had the opportunity to speak about that shadowing experience in a department meeting, which I hope was helpful for others.

Dr. Fischer: Our whole focus for a relatively short time shifted to how to take care of adults within the children's hospital. Although we had some time to prepare – the ICU was the first unit to take adults, so we knew they would come to the floor – it still felt quick. We took adult patients onto the general pediatrics floor from both the emergency department and the ICU. We took adults mostly with COVID-19, but we did have some young adults admitted for other reasons too. Those of us who were on service during this time collaborated closely, sharing what we learned and even joining one another on rounds to provide support. We basically would "teach it forward" as we learned. We also had adult providers available by phone for questions, and our pediatric subspecialists were readily available for consults and would reach out to their adult counterparts for support. Some of the hospitalists were reaching out to POPCoRN, and some were attending an ACLS crash course prior to getting on service.

What was hardest about this experience for you?

Dr. Dunbar: For me, one of the hardest aspects of dealing with COVID-19 was the unknown. In every aspect of professional life and clinical care, there were unanswered questions. What's the best way to care for these patients? What prognoses can we give their loved ones? How can I help when it seems like there's so little I can offer? Will we run out of PPE? As doctors, what behaviors most endanger our friends and family when we go home after work? When will things start to get better?

Dr. Hodo: For me, the week or two before being notified of the deployment was the worst and hardest time. The uncertainty about if I would be called or no, and to do

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what? And where? I was trying to read everything there was on management, what little was known about treatment, and so on. Once I received notification of a start date, that allowed me to focus on very clear endpoints and knowledge items (for example, reviewing ACLS algorithms) and to do things I knew would help me settle and be more effective (like shadowing).

Dr. Fischer: It was a lot of new. Not only were we taking care of a population that we hadn't cared for since medical school (adults), but we were facing a disease process that was also new to everyone. We were learning on our feet, while at the same time providing guidance to our house staff.

What have you learned about yourself that you did not know before?
Dr. Dunbar: I was surprised to learn how much I liked caring for adult patients. The fear I felt immediately before they arrived dissipated fairly quickly after they arrived. The opportunity to address their chronic conditions while supporting them in an acute illness took me back to many of the fundamentals of medicine that I hadn't thought much about since medical school. I liked that they could speak up to tell us how they were feeling, both physically and emotionally, so that we could address their needs and allow them to participate in their own care. Some of my favorite patients kept detailed histories of their own C-reactive protein values and oxygen levels to show they were active participants in their own recovery.

I was worried that these adult patients would be offended or scared to learn that they were being cared for by pediatricians, but at no point did anyone ask me why they were not assigned to an adult hospitalist. They saw us only as doctors and nurses, and they were grateful for our care. One 65-year-old U.S. Army veteran told me that his nurse had told him to take a shower and make his bed. "She treated me just like a 5-year-old kid. And I loved it!" he said.

Dr. Hodo: I don't know that I was totally unaware of these things, but I will say that I had partially forgotten them: I really like adult medicine, and I love geriatrics. I like high-energy and high-stress situations … at least occasionally! I feel very comfortable discussing end-of-life decisions and death. I cope with personal stress by helping and supporting others – patients, team members, colleagues, neighbors. I risk not taking enough time for myself and have to remind myself to do so.

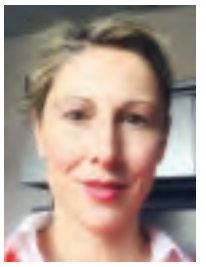
Dr. Fischer: I actually loved taking care of adults. It felt like there was a different kind of patient-doctor relationship to be had, and it was interesting to get to know people who had jobs and families of their own – essentially a different type of story than you typically hear taking care of children.

Were there any silver linings in this situation? How did you grow personally through this experience? What do we need to do better going forward as a profession and a community?
Dr. Dunbar: The part that I hope will stay with me is the memory of how we came together as clinicians to fight a common invisible enemy. The teamwork was unprecedented. Our day-to-day goals were simple and straightforward: Do what needed to be done to help as many New Yorkers as possible. Our team made themselves available for last-minute meetings and shift changes without complaint. We practiced a type of medicine that prioritized patient comfort, flexibility, and compassionate care. We ordered methadone and insulin and antihypertensives – brand new experiences for us, but we figured it out. We worked through novel clinical problems together because there was no textbook to read.

"With the help of an ad hoc palliative care team, we improved how we listened to patients' own self-directed needs."

Our colleagues from other specialties and different levels of experience stepped up to join us on overnight shifts, and we welcomed them. With the help of an ad hoc palliative care team, we improved how we listened to patients' own self-directed needs. We reached across the aisle to our internal medicine and adult hospitalist colleagues to refresh our memories on chronic conditions, and they always answered the phone. I hope we always remember who we were during this crisis, because we were ourselves at our most generous.

Dr. Hodo: This was an unexpected but great opportunity to meet physicians, nurses, and staff in different departments and sections of the hospital from my own. I am hopeful that this experience will help us in the future with multidisciplinary work and breaking down silos that isolate specialties and units in the hospital.


Dr. Giordano

I feel (and this is probably weird) invigorated by this experience. It feels good to have been able to help when I was needed. Even though there are a lot of things in adult hospital medicine I do not know, I know I did my best, asked for help when I needed it, and asked for feedback regularly from the medicine residents and nurses I worked with. I know I supported my team and my colleagues to the best of my ability through stressful and sometimes upsetting and emotionally draining times.

As a profession, we can continue to remember the value of the multidisciplinary team and the value of listening to, and making space for, different voices to be heard. We can reconsider the traditional, rigid hierarchy in medicine and medical education that can stifle creative thought and innovative ideas. We can remember that the people "at the top" of the pyramid can always learn something from those "at the bottom." We can see the ways that department and discipline and specialty can help us but also sometimes hinder, and seek involvement in programs and discussions that unite and pool resources and skills. And, most of all, we can try, every day we are at work, to put the patients' and families' needs first – and when we leave work, to turn that around, and put ourselves and our loved ones in that prime position.

As a community, we also can work on thinking communally – that, after all, is the entire point of the wearing of masks in public and social distancing. It is as much about you as about me! We can try to hold on to some of this perspective of the greater good and appreciation for the work others do that makes our lives better and easier. It is not only health care workers who deserve a round of applause every day; it is every person who did something today that benefited someone else, be that giving extra space in a line, wearing a mask in a store, delivering food to an elder, teaching a class over Zoom, or simply minimizing time outside the house. It is every person who thought about the community at or near the same level of priority that they thought about themselves.

Dr. Fischer: It was a very challenging situation, but because our adult patients in the children's hospital were relatively young with fewer comorbidities, we got to see people get well. I took care of one man with renal failure who we thought would be on dialysis for the rest of his life. By the end of my first week on service, he had begun to regain kidney function. It was amazing. I think most frontline providers caring for adults in this pandemic have had to face significant morbidity and mortality. I felt lucky that we were able to care for patients who generally got better.

I recently read the article published in the *Journal of Pediatrics* laying out how the Children's Hospital at Montefiore adapted an entire pediatric floor to caring for adults.[3] This example of recognition of need, quick preparation, and collaboration both within the children's hospital and with the adult hospital was admirable. I also feel that at the beginning of this pandemic, there was a glimmer that the failure of our health care system to cover everyone and the repercussions of this failure would be drawn into sharp relief. I hope that this understanding of the importance of universal coverage persists beyond the pandemic.

Dr. Giordano is assistant professor of pediatrics at Columbia University and a pediatric hospitalist at NewYork-Presbyterian Morgan Stanley Children's Hospital with an interest in surgical comanagement. She serves on the Society of Hospital Medicine's Pediatric Special Interest Group Executive Committee and is the chair of the Education Subcommittee. She is also an advisory board member for the New York/Westchester SHM Chapter.

References

1. Kumaraiah D et al. Innovative ICU physician care models: Covid-19 pandemic at New York–Presbyterian. NEJM Catal. 2020 Apr 28. doi: 10.1056/CAT.20.0158.

2. Kim MK et al. A primer for clinician deployment to the medicine floors from an epicenter of Covid-19. NEJM Catal. 2020 May 4. doi: 10.1056/CAT.20.0180.

3. Philips K et al. Rapid implementation of an adult COVID-19 unit in a children's hospital. J Pediatr. 2020. doi: 10.1016/j.jpeds.2020.04.060.

Pooled SARS-CoV-2 testing feasible, greatly reduces supply use

Straightforward, cost effective, and efficient

By Troy Brown, RN

Combining specimens from several low-risk inpatients in a single test for SARS-CoV-2 infection allowed hospital staff to stretch testing supplies and provide test results quickly for many more patients than they might have otherwise, researchers found.

"We believe this strategy conserved PPE [personal protective equipment], led to a marked reduction in staff and patient anxiety, and improved patient care," wrote David Mastrianni, MD, and colleagues from Saratoga Hospital in Saratoga Springs, N.Y. "Our impression is that testing all admitted patients has also been reassuring to our community."

The researchers published their findings July 20 in the *Journal of Hospital Medicine* (doi: 10.12788/jhm.3501).

"What was really important about this study was they were actually able to implement pooled testing after communication with the [Food and Drug Administration]," Samir S. Shah, MD, MSCE, SFHM, the journal's editor-in-chief, said in an interview.

"Pooled testing combines samples from multiple people within a single test. The benefit is, if the test is negative [you know that] everyone whose sample was combined ... is negative. So you've effectively tested anywhere from three to five people with the resources required for only one test," Dr. Shah continued.

The challenge is that, if the test is positive, everyone in that testing group must be retested individually because one or more of them has the infection, said Dr. Shah, director of hospital medicine at Cincinnati Children's Hospital Medical Center.

Dr. Mastrianni said early in the pandemic they started getting the "New York surge" at their hospital, located approximately 3 hours from New York City. They wanted to test all of the inpatients at their hospital for COVID-19 and they had a rapid in-house test that worked well, "but we just didn't have enough cartridges, and we couldn't get deliveries, and we started pooling." In fact, they ran out of testing supplies at one point during the study but were able to replenish their supply in about a day, he noted.

For the current study, all patients admitted to the hospital, including those admitted for observation, underwent testing for SARS-CoV-2. Staff in the emergency department designated patients as low risk if they had no symptoms or other clinical evidence of COVID-19; those patients underwent pooled testing.


Dr. Shah

Patients with clinical evidence of COVID-19, such as respiratory symptoms or laboratory or radiographic findings consistent with infection, were considered high risk and were tested on an individual basis and thus excluded from the current analysis.

The pooled testing strategy required some patients to be held in the emergency department until there were three available for pooled testing. On several occasions when this was not practical, specimens from two patients were pooled.

Between April 17 and May 11, clinicians tested 530 patients via pooled testing using 179 cartridges (172 with swabs from 3 patients and 7 with swabs from 2 patients). There were four positive pooled tests, which necessitated the use of an additional 11 cartridges. Overall, the testing used 190 cartridges, which is 340 fewer than would have been used if all patients had been tested individually.

Among the low-risk patients, the positive rate was 0.8% (4/530). No patients from pools that were negative tested positive later during their hospitalization or developed evidence of the infection.

Team effort, flexibility needed

Dr. Mastrianni said he expected their study to find that pooled testing saved testing resources, but he "was surprised by the complexity of the logistics in the hospital, and how it really required getting everybody to work together. ...There were a lot of details, and it really took a lot of teamwork."

The nursing supervisor in the emergency department was in charge of the batch and coordinated with the laboratory, he explained. There were many moving parts to manage, including monitoring how many patients were being admitted, what their conditions were, whether they were high or low risk, and where they would house those patients as the emergency department became increasingly busy. "It's a lot for them, but they've adapted really well," Dr. Mastrianni said.

Pooling tests seems to work best for three to five patients at a time; larger batches increase the chance of having a positive test, and thus identifying the sick individual(s) becomes more challenging and expensive, Dr. Shah said.

"It's a fine line between having a pool large enough that you save on testing supplies and testing costs but not having the pool so large that you dramatically increase your likelihood of having a positive test," Dr. Shah said.

Hospitals will likely need to be flexible and adapt as the local positivity rate changes and supply levels vary, according to the authors.

"Pooled testing is mainly dependent on the COVID-19–positive rate in the population of interest in addition to the sensitivity of the RT-PCR [reverse transcriptase-polymerase chain reaction] method used for COVID-19 testing," said Baha Abdalhamid, MD, PhD, of the department of pathology and microbiology at the University of Nebraska Medical Center in Omaha.

"Each laboratory and hospital needs to do their own validation testing because it is dependent on the positive rate of COVID-19," added Dr. Abdalhamid, who was not involved in the current study.

A version of this article originally appeared on Medscape.com.

iResident: Virtual care on hospital medicine teaching services during a pandemic

By Benji K. Mathews, MD, FACP, SFHM; Ameet P. Doshi, MD, MBA

At the start of each shift on his clinical service with rotating internal medicine residents, Benji Mathews, MD, SFHM, now adds a few components to his usual preparation. First, visiting the Minnesota Department of Health and various organizational websites to review the latest COVID-19 updates and guidelines. Next comes checking to see where he needs to pick up the surgical mask and eye protection that he will need to wear through the day. Last, he evaluates which of his patients are in telemedicine-equipped rooms; this last change has fast become a crucial part of working with his resident learners during a pandemic.

During the COVID-19 pandemic, residents and residency programs find themselves in a unique situation. Balancing the educational needs of a training program with the safety of trainees is a challenging task, specifically when taking care of patients who are COVID-19 positive or patients under investigation (PUI). One increasingly available tool that can help protect trainees while continuing to prioritize patient care and medical education is the use of telemedicine for virtual rounding. For our internal medicine residents through the University of Minnesota Internal Medicine Residency program rotating at Regions Hospital in St. Paul, Minn., we have used video visits to continue our mandate as both health care and education professionals.

Virtual care decision tree

Virtual care can mitigate exposure risk, minimize use of personal protective equipment (PPE), and improve communications with patients and their families. To guide our teaching teams on the optimal situations for telemedicine, we needed to select those patients who would be most appropriate for a virtual visit.

For example, patients with advanced dementia, or intubated in the intensive care unit, would have less utility from a real-time video encounter. Further, we implemented a simple decision tree (Figure 1). First, the team needs to decide whether the patient needs an immediate in-person assessment; for instance, for critically ill patients or those who need end-of-life care discussions, telemedicine would not be an appropriate modality. Next, the decision is made on whether a patient requires an in-person exam at that time. The idea of forgoing the in-person physical exam may run counterintuitive to the core training medical providers undergo, but in certain circumstances telemedicine can still provide the appropriate level of care a patient requires.

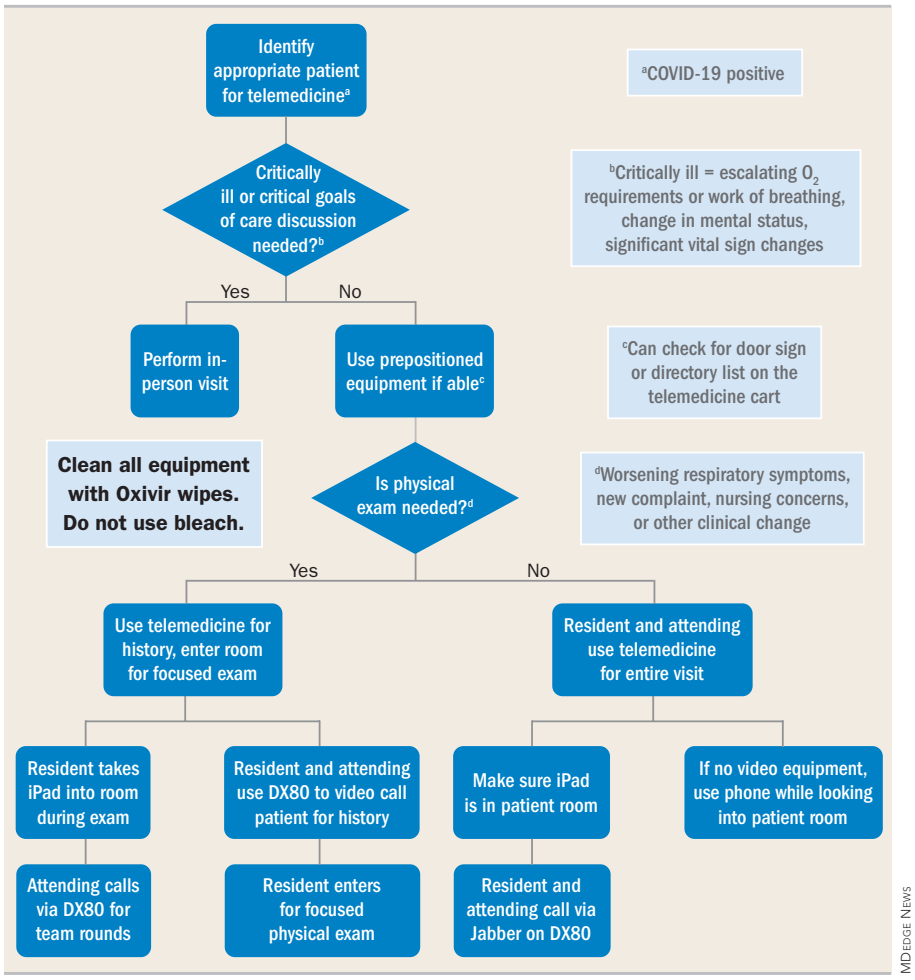
Virtual rounding with residents: Pros and cons

Through the course of this pandemic, there have many questions raised regarding how to handle inpatient teaching services: Should resident teams be assigned COVID-19 positives or PUIs? How do you optimize assessing and learning from patients' conditions that require human touch? Should all members of the teaching team be donning PPE and entering the patient room?

Internal medicine residents in our hospital have been assigned COVID-19–positive and PUI patients. With proper PPE, and donning and doffing practices, residents may continue to learn from this important training opportunity while also optimizing care for patients supplemented by telemedicine. This pandemic has flattened the hierarchy; often residents are teaching their attendings much of the latest literature and best practices around COVID-19. Residents also benefit by joining the organization's daily virtual interprofessional COVID-19 huddle where they partner with infectious disease, critical care, pharmacy, and other experts to collaborate in the care of these patients.

There have been counterarguments made for residents joining the front lines with COVID-19 patients. Some have conditions that limit them from seeing this subgroup of patients, such as their immune status or other issues. For these residents, we do not assign COVID-19–positive patients. However, they may continue to support in virtually updating COVID-19 patients and their families. A second argument has been the use of PPE. We have implemented telemedicine to limit the total number of exposures and have a protocol for the fewest number of providers possible to see any at-risk or confirmed COVID-19 patient. For example, a resident who sees a COVID-19 patient in person may also be simultaneously virtually supervised by the attending.

Figure 1. Resident decision tree for telemedicine/virtual care



MDEDGE News

Source: Dr. Mathews, Dr. Doshi

Webside manner

The physical exam is only one of several operational considerations when delivering virtual care, whether with a teaching or nonteaching service. One important aspect is the "webside manner" of the provider, the virtual analogue to bedside manner.

Inherent parts of in-person encounters, such as eye contact and allowing for patients to finish their sentences, have added nuances with virtual care. For instance, providers must adjust to looking into the web camera to make eye contact, even though the patient's face may be on the screen below. Additionally, for patients who are hard of hearing or unfamiliar with video calling, providers must be cognizant of projecting well over an Internet connection and timing responses to avoid overlapping conversation.

Similarly, there are nuances to the virtual physical exam, some specific to care in the COVID-19 era. In our previous virtual care practice, a bedside facilitator assisted in using tools such a digital stethoscope. In contrast, our current practice aims to refine the observational skills of our learners in conjunction with chart review, vital signs, and active incorporation of the patient in the physical exam. This does not mean asking them to auscultate themselves, but is more toward allowing patients to participate in focused evaluations, such as assessing abdominal tenderness or working through range of motion. Remote guidance for virtual exams also extends itself to teaching teams; for example, in our practice, we have been able to conduct bedside ultrasound teaching with in-person team members and a virtual facilitator.

Maskless connections: 'Face-to-face' visits with patients

As many hospitalists have witnessed, COVID-19 is so isolating for patients and their families. Patients have limited visitors, and their care team members are aiming to minimize exposures. Those who are entering the rooms wear masks and face shields that limit connecting with patients in a truly "face-to-face" manner. Telemedicine provides a face-to-face encounter that arguably improves upon portions of the traditional in-person encounter during this pandemic, with providers wearing PPE. For medical learners, gaining the interpersonal skills essential for health care professionals has been skewed with pandemic-related limitations; telemedicine can provide a tool to adapt to this unique era and augment this important educational piece.

Limitations, equity, and technological considerations

Realistically, the virtual exam during COVID-19 does have its limitations. An important part of virtual care and teaching services is instilling the appropriate times for use of telemedicine. If a patient has a clinical change (such as increase in FiO_2 requirements) or other clinical need, there should be no hesitation for learners to conduct in-person assessments with appropriate PPE.

Nonexam indications are just as important – for example, if a patient requires extensive goals-of-care counseling, we recommend this not be done virtually. Other indications may vary between organizations; in our practice, we suggest at least one in-person assessment on the initial and discharge hospital days. Regardless of the specific indications, a successful virtual inpatient teaching service must be predicated on outlining the appropriate uses of telemedicine.

In the United States, there are already health care disparities for people of color and non–English speakers. If there is not a careful consideration for these marginalized groups, their health disparities could be further exacerbated – not just around COVID-19, but also for other inpatient conditions where telemedicine is being used. Groups whose equity must be thoughtfully managed include those who do not speak English and those who do not have access to smartphones or the Internet. Our HealthPartners organization has implemented the integration of interpreters for virtual three-way connections with patients and their clinicians to help mitigate this for non–English speakers. Additionally, utilizing easy-to-use tablets and telemedicine-capable carts has helped patients overcome technology barriers.

Last, the members of the teaching team must know the essential technical aspects of the technology they are using. Robust information technology (IT) support is also needed, but no matter how simple the equipment may be, staff and trainees must know how to both operate it and handle basic troubleshooting (such as audio or video disconnections). This also dovetails with the important element of on-boarding other members of the care team. In our practice, nursing staff, chaplains, interpreters, and dietitians also use virtual care as part of their workflow. However, even if it is used only by the teaching team, orienting other care team members will limit technical problems such as equipment being turned off or moved out of position.

Prior to the COVID-19 pandemic, telemedicine adoption was limited because of lack of awareness, barriers in training and understanding, and narrow beliefs regarding the innovation. The COVID-19 pandemic has resulted in a remarkable increase in the provision of telemedicine services in the inpatient hospital medicine services. Importantly, it is, and should be, a developing part of the education and training for health care learners. This pandemic has underscored the need for providing telemedicine services that will likely long outlast this crisis, and to support our health care learners in being effective "iResidents" on our care teams.

Takeaways

- **The future of graduate medical education involves virtual care.**

The COVID-19 pandemic response has demonstrated that virtual care plays an instrumental part in patient care, and its effects will not dissipate when the pandemic is done. The curriculum for health care trainees should incorporate telemedicine competencies so that they may more effectively leverage this technology for improving care delivery.

- **Selection of telemedicine patients must be stratified.**

For the highest utility for medical learners on telemedicine to be obtained, there needs to be a clear decision process for which patients can be seen virtually. This involves both clinical criteria, such as no virtual care for end-of-life discussions, and patient criteria, such as hard of hearing.

- **Virtual communication requires new communication skills.**

Seeing patients via telemedicine mandates a different skill set than in-person communication. Learners must improve their "webside manner" in order to build the patient-provider relationship. Instilling these tools can pay dividends in settings where telemedicine has high yield, such as maskless communication during a pandemic.

- **Health disparities could be further exacerbated by telemedicine and should not be overlooked.**

Equity in access to health care applies to telemedicine as it does to many other elements. There are multiple groups that can suffer from disparities, such as patients who need interpreters, or those who have lower technological literacy and access to digital devices. Creating awareness of these pitfalls in virtual care can help medical learners recognize and support in creative solutions for these factors.

Dr. Mathews

Dr. Doshi

Dr. Mathews is chief, hospital medicine, at Regions Hospital, HealthPartners, St. Paul, Minn. Dr. Doshi is telemedicine director, hospital medicine, HealthPartners.

Courtesy HealthPartners

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PHM Fellows

Reflections from PHM's chief fellow

The education of a new generation of subspecialists

By Adam Cohen, MD

Editor's note: *The Hospitalist is excited to debut a quarterly Pediatric Hospital Medicine Fellows column with this article by pediatric hospitalist Adam Cohen.*

In June 2019, I was offered the new role of chief fellow of pediatric hospital medicine at Baylor College of Medicine and Texas Children's Hospital, both in Houston. After messaging colleagues and friends at PHM fellowships across the country, I discovered that I wasn't only Baylor's first chief fellow of PHM, but I was the only chief fellow of PHM in the nation.

At first, this seemed to be a daunting prospect that left me wondering what my experiences would be like. However, as any good academician knows, the only way to properly answer a question with such existential considerations is a literature review.

While the role of chief fellow exists in other pediatric subspecialty fellowships, the literature on this role is not yet developed. I focused my literature review on using the chief resident role as a surrogate. The chief resident position is filled with opportunities to work administratively and educationally and even has the potential to drive interinstitutional educational change. However, many chief residents feel their administrative roles outweigh their educational ones. This worried me, as the administrative side of program leadership was something that I had little experience in. Would I be weighed down with answering emails and fielding grievances from other fellows? While I did occasionally have that responsibility, my experiences as a chief fellow meant being intimately involved in one program's response and growth during a national change to PHM as a field, while also coaching those from other programs on how to respond to these many changes.

The dawn of this new era of PHM saw the first board-certified hospitalists crowned and the first fellowships accredited by the Accreditation Council for Graduate Medical Education within the past academic year. I experienced this in a unique position as a chief fellow – an insider as part of the administration and an outsider as a prospective specialist. Prior to the recent accreditation and certification, PHM fellowship graduates were becoming successful academic physicians. A 2014 study of over 80% of all graduated PHM fellows showed nearly all had academic positions in which they taught students and residents. Many of these graduates also participated in research, with two-thirds being the first author on at least one peer-reviewed article.

However, we also know that, prior to accreditation, fellowship training was varied, with clinical time ranging from 20% to 65%, in addition to wide variability in billing practices, scholarly practices, and the ability to pursue advanced nonclinical training, such as coursework or master's degrees in quality improvement or education. With PHM fellowships becoming accredited and hospitalists becoming board certified, this is going to change, hopefully for the better.

National accrediting bodies like the ACGME create standards for programs to follow, but as a field we have to make sure we know what those standards mean for our future fellows and our educators. At my own program, these standards meant a significant reduction in clinical time, which was the main way fellows obtained content mastery in PHM. There were also concerns from practicing hospitalists about what it would mean if they did not or could not "grandfather in" to board certification. Would they be pushed out of their jobs or forced into less desirable ones? Would they be able to continue teaching and working with fellows?

As I reflect on experiencing this tumultuous time of change for our specialty, my main takeaway is that board certification of PHM faculty and accreditation of fellowships is an important step to creating the next generation of productive academic hospitalists. The greatest benefit for PHM fellows is that ACGME accreditation mandates that they be treated as learners, and not just junior attendings who are paid less. Many programs rely on fellow billing to fund fellowships, which can create a culture where the focus falls away from exploring a wide variety of educational opportunities and toward an exclusive or near-exclusive service-learning model.

This old model can come at the expense of opportunities such as conferences or secondary degrees. Under ACGME accreditation, fellowships will also be required to provide a regimented system of mentorship and support, more than just nonclinical time, to allow fellows to follow their interests and passions, whether that be in clinical hospital medicine, education, quality, advocacy, or more. When these fellows graduate and become board certified, they will truly have recognition as specialists in the field, and be able to advance the field in any setting they choose to practice.

Like any change, this shift in our field also comes with our fair share of risks. Fellowship programs have to be careful about what they take away from an accreditation process that can be incredibly time consuming and difficult. Leadership at these programs need to look critically at the changes they are required to make, and ensure they are integrated intelligently in a way that benefits the fellows.

At Baylor, while a decrease in clinical time was required, our leadership saw it as an opportunity to implement active learning and assessment techniques to improve clinical mastery with less clinical time. While many programs may need to make significant changes to align with ACGME standards, a key lesson in education is that these changes also need to reflect the goal of the program, to create expert academicians, clinicians, and leaders in pediatric hospital medicine.

One of the largest challenges brought about by these changes is how we take into account pediatric hospitalists with clinical expertise who either are not academically oriented or are not eligible for board certification. Excluding them from participating in fellowship training or as productive members of our groups can create a hidden curriculum that board certification and academic practice are the only way forward in our field.

We also risk excluding those with the ability to fill the largest need in our specialty, those who practice clinically in the community.

Dr. Cohen is an assistant professor of pediatrics in the section of hospital medicine at Baylor College of Medicine and Texas Children's Hospital. He graduated from PHM fellowship in June 2020 at Baylor, dedicating himself to developing expertise in medical education. *He would like to thank Michelle Lopez, MD, for her assistance in revising this article.*

We must ensure that our desire to have productive academic faculty does not result in the loss of those with clinical expertise, both for the care of our patients and the education of our learners. Whether that solution lies with alternative certification procedures or through thoughtful hiring and educational policies is yet to be seen.

Overall, as PHM's chief fellow this past academic year, I found that we have a lot to be excited for as our field continues to grow. With this growth, we need be careful about how we move forward with the standardization of our training, education, and faculty practices to align with our core values of excellent care for children and advancement of our field to meet their needs and the needs of our medical system.

I am grateful to the many pediatric hospital medicine leaders and providers who have thoughtfully stimulated so much growth in the field and paved the way for current and future generations of fellows to benefit from that growth.

For a complete list of references, see the online version of this column at www.the-hospitalist.org.

Sleepless in the pandemic

Media overexposure and stress

By Therese Borden
MDedge News

Sleep difficulties during the COVID-19 crisis may be exacerbated by media overexposure and other factors causing fear and stress, according to findings from a large survey of French individuals.

"Physicians usually recommend coping with sleep disorders by exercising, going outside, avoiding screen time, and having a regular schedule – all recommendations difficult to apply during lockdown. Being forced to stay home and the ensuing boredom and loneliness may have led to increased [media exposure], especially among disadvantaged people and overexposure to media COVID-19 content may have contributed to fright and emotional distress," Damien Leger of the Centre du Sommeil et de la Vigilance, Hôtel Dieu APHP, Université de Paris, and his colleagues wrote in the journal Sleep (2020 Jul 25. doi: 10.1093/sleep/zsaa125).

The investigators analyzed data from survey respondents about their sleep problems since the COVID-19 lockdown and other topics such as employment, daily activities, and sleep medications. The survey was part of a large research project, COCONEL, that has been developed to study the French population on a variety of behaviors and comprises 750,000 permanent panelists who respond to surveys. The survey was sent to a random sample of panelists with no topic label to avoid selection bias. Of the 25,800 surveys sent, 1,005 responses were recorded.

Respondents were classified as having severe sleep problems if they reported that their daytime activities were affected or if their sleeping medications had increased since the lockdown. While 73% of respondents reported poor sleep in the 8 previous days, 25% reported severe sleep problems, and 54% reported that their sleep problems had worsened during the COVID-19 lockdown.

A media exposure score was created with a Likert scale (strongly agree, agree, disagree, strongly disagree) about media exposures of different types. The investigators also queried respondents about the degree to which they found media coverage of the pandemic provoked a fear response. Overall, 68% of respondents agreed that media images and stories about COVD-19 were frightening.

The researchers found a strong association between severe sleeping problems and a high media exposure score (risk ratio, 1.49; 95% confidence interval, 1.10-2.01; $P < .05$).

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In addition, trepidation and fear from media exposure to COVID-19 news was also associated with severe sleep problems (RR, 1.27; 95% CI, 0.92-1.75; $P < .05$). "Suffering from sleep problems may have increased media use at night, and thus increased stress and/or psychological distress and reinforced sleeping problems," the investigators wrote.

Not surprisingly, respondents with financial difficulties due to the pandemic also reported severe sleeping difficulties (RR, 1.99; 95% CI, 1.49-2.65; $P < .05$).

For individuals who have been treated for sleep problems, the COVID-19 pandemic may ratchet up their sleep challenges. The strongest association with severe sleep problems was found in those respondents who were already taking sleeping medications before the pandemic (RR, 2.72; 95% CI, 2.04-3.61; $P < .05$).

The COCONEL survey has been funded by the French and National Agency for Research, the Fondation de France, and the National Research Institute for Sustainable Development.

prior to treatment, or dual antiplatelet therapy. XARELTO is not for use for primary VTE prophylaxis in these hospitalized, acutely ill medical patients at high risk of bleeding.

Reversal of Anticoagulant Effect

An agent to reverse the anti-factor Xa activity of rivaroxaban is available. Because of high plasma protein binding, rivaroxaban is not dialyzable *[see Clinical Pharmacology (12.3) in Full Prescribing Information]*. Protamine sulfate and vitamin K are not expected to affect the anticoagulant activity of rivaroxaban. Use of procoagulant reversal agents, such as prothrombin complex concentrate (PCC), activated prothrombin complex concentrate or recombinant factor VIIa, may be considered but has not been evaluated in clinical efficacy and safety studies. Monitoring for the anticoagulation effect of rivaroxaban using a clotting test (PT, INR or aPTT) or anti-factor Xa (FXa) activity is not recommended.

Spinal/Epidural Anesthesia or Puncture

When neuraxial anesthesia (spinal/epidural anesthesia) or spinal puncture is employed, patients treated with anticoagulant agents for prevention of thromboembolic complications are at risk of developing an epidural or spinal hematoma which can result in long-term or permanent paralysis *[see Boxed Warning]*.

To reduce the potential risk of bleeding associated with the concurrent use of XARELTO and epidural or spinal anesthesia/analgesia or spinal puncture, consider the pharmacokinetic profile of XARELTO *[see Clinical Pharmacology (12.3) in Full Prescribing Information]*. Placement or removal of an epidural catheter or lumbar puncture is best performed when the anticoagulant effect of XARELTO is low; however, the exact timing to reach a sufficiently low anticoagulant effect in each patient is not known.

An indwelling epidural or intrathecal catheter should not be removed before at least 2 half-lives have elapsed (i.e., 18 hours in young patients aged 20 to 45 years and 26 hours in elderly patients aged 60 to 76 years), after the last administration of XARELTO *[see Clinical Pharmacology (12.3) in Full Prescribing Information]*. The next XARELTO dose should not be administered earlier than 6 hours after the removal of the catheter. If traumatic puncture occurs, delay the administration of XARELTO for 24 hours.

Should the physician decide to administer anticoagulation in the context of epidural or spinal anesthesia/analgesia or lumbar puncture, monitor frequently to detect any signs or symptoms of neurological impairment, such as midline back pain, sensory and motor deficits (numbness, tingling, or weakness in lower limbs), bowel and/or bladder dysfunction. Instruct patients to immediately report if they experience any of the above signs or symptoms. If signs or symptoms of spinal hematoma are suspected, initiate urgent diagnosis and treatment including consideration for spinal cord decompression even though such treatment may not prevent or reverse neurological sequelae.

Use in Patients with Renal Impairment

Nonvalvular Atrial Fibrillation

Periodically assess renal function as clinically indicated (i.e., more frequently in situations in which renal function may decline) and adjust therapy accordingly *[see Dosage and Administration (2.1) in Full Prescribing Information]*. Consider dose adjustment or discontinuation of XARELTO in patients who develop acute renal failure while on XARELTO *[see Use in Specific Populations]*.

Treatment of Deep Vein Thrombosis (DVT), Pulmonary Embolism (PE), and Reduction in the Risk of Recurrence of DVT and of PE

In patients with CrCl <30 mL/min, rivaroxaban exposure and pharmacodynamic effects are increased compared to patients with normal renal function. There are limited clinical data in patients with CrCl 15 to <30 mL/min; therefore, observe closely and promptly evaluate any signs or symptoms of blood loss in these patients. There are no clinical data in patients with CrCl <15 mL/min (including patients on dialysis); therefore, avoid the use of XARELTO in these patients.

Discontinue XARELTO in patients who develop acute renal failure while on treatment *[see Use in Specific Populations]*.

Prophylaxis of Deep Vein Thrombosis Following Hip or Knee Replacement Surgery

In patients with CrCl <30 mL/min, rivaroxaban exposure and pharmacodynamic effects are increased compared to patients with normal renal function. There are limited clinical data in patients with CrCl 15 to <30 mL/min; therefore, observe closely and promptly evaluate any signs or symptoms of blood loss in these patients. There are no clinical data in patients with CrCl <15 mL/min (including patients on dialysis); therefore, avoid the use of XARELTO in these patients.

Discontinue XARELTO in patients who develop acute renal failure while on treatment *[see Use in Specific Populations]*.

Prophylaxis of Venous Thromboembolism in Acutely Ill Medical Patients at Risk for Thromboembolic Complications Not at High Risk of Bleeding

In patients with CrCl <30 mL/min, rivaroxaban exposure and pharmacodynamic effects are increased compared to patients with normal renal function. There are limited clinical data in patients with CrCl 15 to <30 mL/min; therefore, observe closely and promptly evaluate any signs or symptoms of blood loss in these patients. There are no clinical data in patients with CrCl <15 mL/min (including patients on dialysis); therefore, avoid the use of XARELTO in these patients.

Discontinue XARELTO in patients who develop acute renal failure while on treatment *[see Use in Specific Population]*.

Use in Patients with Hepatic Impairment

No clinical data are available for patients with severe hepatic impairment.

Avoid use of XARELTO in patients with moderate (Child-Pugh B) and severe (Child-Pugh C) hepatic impairment or with any hepatic disease associated with coagulopathy since drug exposure and bleeding risk may be increased *[see Use in Specific Populations]*.

Use with P-gp and Strong CYP3A Inhibitors or Inducers

Avoid concomitant use of XARELTO with known combined P-gp and strong CYP3A inhibitors *[see Drug Interactions]*.

Avoid concomitant use of XARELTO with drugs that are known combined P-gp and strong CYP3A inducers *[see Drug Interactions]*.

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Risk of Pregnancy-Related Hemorrhage

In pregnant women, XARELTO should be used only if the potential benefit justifies the potential risk to the mother and fetus. XARELTO dosing in pregnancy has not been studied. The anticoagulant effect of XARELTO cannot be monitored with standard laboratory testing. Promptly evaluate any signs or symptoms suggesting blood loss (e.g., a drop in hemoglobin and/or hematocrit, hypotension, or fetal distress) *[see Warnings and Precautions and Use in Specific Populations]*.

Patients with Prosthetic Heart Valves

On the basis of the GALILEO study, use of XARELTO is not recommended in patients who have had transcatheter aortic valve replacement (TAVR) because patients randomized to XARELTO experienced higher rates of death and bleeding compared to those randomized to an anti-platelet regimen. The safety and efficacy of XARELTO have not been studied in patients with other prosthetic heart valves or other valve procedures. Use of XARELTO is not recommended in patients with prosthetic heart valves.

Acute PE in Hemodynamically Unstable Patients or Patients Who Require Thrombolysis or Pulmonary Embolectomy

Initiation of XARELTO is not recommended acutely as an alternative to unfractionated heparin in patients with pulmonary embolism who present with hemodynamic instability or who may receive thrombolysis or pulmonary embolectomy.

Increased Risk of Thrombosis in Patients with Triple Positive Antiphospholipid Syndrome

Direct-acting oral anticoagulants (DOACs), including XARELTO, are not recommended for use in patients with triple-positive antiphospholipid syndrome (APS). For patients with APS (especially those who are triple positive [positive for lupus anticoagulant, anticardiolipin, and anti-beta 2-glycoprotein I antibodies]), treatment with DOACs has been associated with increased rates of recurrent thrombotic events compared with vitamin K antagonist therapy.

ADVERSE REACTIONS

The following clinically significant adverse reactions are also discussed in other sections of the labeling:

- Increased Risk of Stroke After Discontinuation in Nonvalvular Atrial Fibrillation *[see Boxed Warning and Warnings and Precautions]*
- Bleeding Risk *[see Warnings and Precautions]*
- Spinal/Epidural Hematoma *[see Boxed Warning and Warnings and Precautions]*

Clinical Trials Experience

Because clinical trials are conducted under widely varying conditions, adverse reaction rates observed in the clinical trials of a drug cannot be directly compared to rates in the clinical trials of another drug and may not reflect the rates observed in clinical practice.

During clinical development for the approved indications, 31,691 patients were exposed to XARELTO. These included 7111 patients who received XARELTO 15 mg or 20 mg orally once daily for a mean of 19 months (5558 for 12 months and 2512 for 24 months) to reduce the risk of stroke and systemic embolism in nonvalvular atrial fibrillation (ROCKET AF); 6962 patients who received XARELTO 15 mg orally twice daily for three weeks followed by 20 mg orally once daily to treat DVT or PE (EINSTEIN DVT, EINSTEIN PE), 10 mg or 20 mg orally once daily (EINSTEIN Extension, EINSTEIN CHOICE) to reduce the risk of recurrence of DVT and/or PE; 4487 patients who received XARELTO 10 mg orally once daily for prophylaxis of DVT following hip or knee replacement surgery (RECORD 1-3); 3997 patients who received 10 mg orally once daily for prophylaxis of VTE and VTE-related death in acutely ill medical patients (MAGELLAN) and 9134 patients who received XARELTO 2.5 mg orally twice daily, in combination with aspirin 100 mg once daily, for the reduction in risk of major cardiovascular events in patients with chronic CAD or PAD (COMPASS).

Hemorrhage

The most common adverse reactions with XARELTO were bleeding complications *[see Warnings and Precautions]*.

Nonvalvular Atrial Fibrillation

In the ROCKET AF trial, the most frequent adverse reactions associated with permanent drug discontinuation were bleeding events, with incidence rates of 4.3% for XARELTO vs. 3.1% for warfarin. The incidence of discontinuations for non-bleeding adverse events was similar in both treatment groups.

Table 1 shows the number of patients experiencing various types of bleeding events in the ROCKET AF trial.

Table 1: Bleeding Events in ROCKET AF*- On Treatment Plus 2 Days

Parameter	XARELTO N=7111 n (%/year)	Warfarin N=7125 n (%/year)	XARELTO vs. Warfarin HR (95% CI)
Major Bleeding†	395 (3.6)	386 (3.5)	1.04 (0.90, 1.20)
Intracranial Hemorrhage (ICH)‡	55 (0.5)	84 (0.7)	0.67 (0.47, 0.93)
Hemorrhagic Stroke§	36 (0.3)	58 (0.5)	0.63 (0.42, 0.96)
Other ICH	19 (0.2)	26 (0.2)	0.74 (0.41, 1.34)
Gastrointestinal (GI)¶	221 (2.0)	140 (1.2)	1.61 (1.30, 1.99)
Fatal Bleeding#	27 (0.2)	55 (0.5)	0.50 (0.31, 0.79)
ICH	24 (0.2)	42 (0.4)	0.58 (0.35, 0.96)
Non-intracranial	3 (0.0)	13 (0.1)	0.23 (0.07, 0.82)

Abbreviations: HR = Hazard Ratio, CI = Confidence interval, CRNM = Clinically Relevant Non-Major.

* Major bleeding events within each subcategory were counted once per patient, but patients may have contributed events to multiple subcategories. These events occurred during treatment or within 2 days of stopping treatment.

† Defined as clinically overt bleeding associated with a decrease in hemoglobin of ≥2 g/dL, a transfusion of ≥2 units of packed red blood cells or whole blood, bleeding at a critical site, or with a fatal outcome.

‡ Intracranial bleeding events included intraparenchymal, intraventricular, subdural, subarachnoid and/or epidural hematoma.

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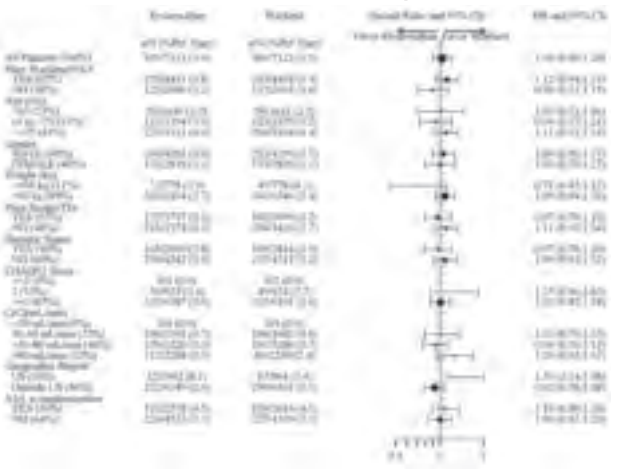
§ Hemorrhagic stroke in this table specifically refers to non-traumatic intraparenchymal and/or intraventricular hematoma in patients on treatment plus 2 days.

¶ Gastrointestinal bleeding events included upper GI, lower GI, and rectal bleeding.

Fatal bleeding is adjudicated death with the primary cause of death from bleeding.

Figure 1 shows the risk of major bleeding events across major subgroups.

Figure 1: Risk of Major Bleeding Events by Baseline Characteristics in ROCKET AF – On Treatment Plus 2 Days



Note: The figure above presents effects in various subgroups all of which are baseline characteristics and all of which were pre-specified (diabetic status was not pre-specified in the subgroup but was a criterion for the CHADS2 score). The 95% confidence limits that are shown do not take into account how many comparisons were made, nor do they reflect the effect of a particular factor after adjustment for all other factors. Apparent homogeneity or heterogeneity among groups should not be over-interpreted.

Treatment of Deep Vein Thrombosis (DVT) and/or Pulmonary Embolism (PE)

EINSTEIN DVT and EINSTEIN PE Studies

In the pooled analysis of the EINSTEIN DVT and EINSTEIN PE clinical studies, the most frequent adverse reactions leading to permanent drug discontinuation were bleeding events, with XARELTO vs. enoxaparin/Vitamin K antagonist (VKA) incidence rates of 1.7% vs. 1.5%, respectively. The mean duration of treatment was 208 days for XARELTO-treated patients and 204 days for enoxaparin/VKA-treated patients.

Table 2 shows the number of patients experiencing major bleeding events in the pooled analysis of the EINSTEIN DVT and EINSTEIN PE studies.

Table 2: Bleeding Events* in the Pooled Analysis of EINSTEIN DVT and EINSTEIN PE Studies

Parameter	XARELTO† N=4130 n (%)	Enoxaparin/ VKA† N=4116 n (%)
Major bleeding event	40 (1.0)	72 (1.7)
Fatal bleeding	3 (<0.1)	8 (0.2)
Intracranial	2 (<0.1)	4 (<0.1)
Non-fatal critical organ bleeding	10 (0.2)	29 (0.7)
Intracranial‡	3 (<0.1)	10 (0.2)
Retroperitoneal‡	1 (<0.1)	8 (0.2)
Intraocular‡	3 (<0.1)	2 (<0.1)
Intra-articular‡	0	4 (<0.1)
Non-fatal non-critical organ bleeding§	27 (0.7)	37 (0.9)
Decrease in Hb ≥ 2 g/dL	28 (0.7)	42 (1.0)
Transfusion of ≥2 units of whole blood or packed red blood cells	18 (0.4)	25 (0.6)
Clinically relevant non-major bleeding	357 (8.6)	357 (8.7)
Any bleeding	1169 (28.3)	1153 (28.0)

* Bleeding event occurred after randomization and up to 2 days after the last dose of study drug. Although a patient may have had 2 or more events, the patient is counted only once in a category.

† Treatment schedule in EINSTEIN DVT and EINSTEIN PE studies: XARELTO 15 mg twice daily for 3 weeks followed by 20 mg once daily; enoxaparin/VKA [enoxaparin: 1 mg/kg twice daily, VKA: individually titrated doses to achieve a target INR of 2.5 (range: 2.0-3.0)]

‡ Treatment-emergent major bleeding events with at least >2 subjects in any pooled treatment group

§ Major bleeding which is not fatal or in a critical organ, but resulting in a decrease in Hb ≥ 2 g/dL and/or transfusion of ≥2 units of whole blood or packed red blood cells

Reduction in the Risk of Recurrence of DVT and/or PE

EINSTEIN CHOICE Study

In the EINSTEIN CHOICE clinical study, the most frequent adverse reactions associated with permanent drug discontinuation were bleeding events, with incidence rates of 1% for XARELTO 10 mg, 2% for XARELTO 20 mg, and 1% for acetylsalicylic acid (aspirin) 100 mg. The mean duration of treatment was 293 days for XARELTO 10 mg-treated patients and 286 days for aspirin 100 mg-treated patients.

Table 3 shows the number of patients experiencing bleeding events in the EINSTEIN CHOICE study.

Table 3: Bleeding Events* in EINSTEIN CHOICE

Parameter	XARELTO† 10 mg N=1127 n (%)	Acetylsalicylic Acid (aspirin)† 100 mg N=1131 n (%)
Major bleeding event	5 (0.4)	3 (0.3)
Fatal bleeding	0	1 (<0.1)
Non-fatal critical organ bleeding	2 (0.2)	1 (<0.1)
Non-fatal non-critical organ bleeding§	3 (0.3)	1 (<0.1)
Clinically relevant non-major (CRNM) bleeding¶	22 (2.0)	20 (1.8)
Any bleeding	151 (13.4)	138 (12.2)

* Bleeding event occurred after the first dose and up to 2 days after the last dose of study drug. Although a patient may have had 2 or more events, the patient is counted only once in a category.
† Treatment schedule: XARELTO 10 mg once daily or aspirin 100 mg once daily.
§ Major bleeding which is not fatal or in a critical organ, but resulting in a decrease in Hb ≥ 2 g/dL and/or transfusion of ≥ 2 units of whole blood or packed red blood cells.
¶ Bleeding which was clinically overt, did not meet the criteria for major bleeding, but was associated with medical intervention, unscheduled contact with a physician, temporary cessation of treatment, discomfort for the patient, or impairment of activities of daily life.

In the EINSTEIN CHOICE study, there was an increased incidence of bleeding, including major and CRNM bleeding in the XARELTO 20 mg group compared to the XARELTO 10 mg or aspirin 100 mg groups.

Prophylaxis of Deep Vein Thrombosis Following Hip or Knee Replacement Surgery

In the RECORD clinical trials, the overall incidence rate of adverse reactions leading to permanent treatment discontinuation was 3.7% with XARELTO.

The rates of major bleeding events and any bleeding events observed in patients in the RECORD clinical trials are shown in Table 4.

Table 4: Bleeding Events* in Patients Undergoing Hip or Knee Replacement Surgeries (RECORD 1-3)

	XARELTO 10 mg	Enoxaparin†
Total treated patients	**N=4487 n (%)**	**N=4524 n (%)**
Major bleeding event	14 (0.3)	9 (0.2)
Fatal bleeding	1 (<0.1)	0
Bleeding into a critical organ	2 (<0.1)	3 (0.1)
Bleeding that required re-operation	7 (0.2)	5 (0.1)
Extra-surgical site bleeding requiring transfusion of >2 units of whole blood or packed cells	4 (0.1)	1 (<0.1)
Any bleeding event‡	261 (5.8)	251 (5.6)
Hip Surgery Studies	**N=3281 n (%)**	**N=3298 n (%)**
Major bleeding event	7 (0.2)	3 (0.1)
Fatal bleeding	1 (<0.1)	0
Bleeding into a critical organ	1 (<0.1)	1 (<0.1)
Bleeding that required re-operation	2 (0.1)	1 (<0.1)
Extra-surgical site bleeding requiring transfusion of >2 units of whole blood or packed cells	3 (0.1)	1 (<0.1)
Any bleeding event‡	201 (6.1)	191 (5.8)
Knee Surgery Study	**N=1206 n (%)**	**N=1226 n (%)**
Major bleeding event	7 (0.6)	6 (0.5)
Fatal bleeding	0	0
Bleeding into a critical organ	1 (0.1)	2 (0.2)
Bleeding that required re-operation	5 (0.4)	4 (0.3)
Extra-surgical site bleeding requiring transfusion of >2 units of whole blood or packed cells	1 (0.1)	0
Any bleeding event‡	60 (5.0)	60 (4.9)

* Bleeding events occurring any time following the first dose of double-blind study medication (which may have been prior to administration of active drug) until two days after the last dose of double-blind study medication. Patients may have more than one event.
† Includes the placebo-controlled period for RECORD 2, enoxaparin dosing was 40 mg once daily (RECORD 1-3)
‡ Includes major bleeding events

Following XARELTO treatment, the majority of major bleeding complications (≥60%) occurred during the first week after surgery.

Prophylaxis of Venous Thromboembolism in Acutely Ill Medical Patients at Risk for Thromboembolic Complications Not at High Risk of Bleeding

In the MAGELLAN study, the most frequent adverse reactions associated with permanent drug discontinuation were bleeding events. Cases of pulmonary hemorrhage and pulmonary hemorrhage with bronchiectasis were observed. Patients with bronchiectasis/pulmonary cavitation, active cancer (i.e., undergoing acute, in-hospital cancer treatment), dual antiplatelet therapy or active gastroduodenal ulcer or any bleeding in the previous three months all had an excess of bleeding with XARELTO compared with enoxaparin/placebo and are excluded from all MAGELLAN data presented in Table 5. The incidence of bleeding leading to drug discontinuation was 2.5% for XARELTO vs. 1.4% for enoxaparin/placebo.

Table 5 shows the number of patients experiencing various types of bleeding events in the MAGELLAN study.

Table 5: Bleeding Events in MAGELLAN* Study–Safety Analysis Set - On Treatment Plus 2 Days

MAGELLAN Study¶	XARELTO 10 mg N=3218 n (%)	Enoxaparin 40 mg / placebo N=3229 n (%)
Major bleeding‡†	22 (0.7)	15 (0.5)
Critical site bleeding	7 (0.2)	4 (0.1)
Fatal bleeding§	3 (<0.1)	1 (<0.1)
Clinically relevant non-major bleeding events (CRNM)	93 (2.9)	34 (1.1)

* Patients at high risk of bleeding (i.e. bronchiectasis/pulmonary cavitation, active cancer, dual antiplatelet therapy or active gastroduodenal ulcer or any bleeding in the previous three months) were excluded.
† Major bleeding events within each subcategory were counted once per patient, but patients may have contributed events to multiple subcategories. These events occurred during treatment or within 2 days of stopping treatment.
‡ Defined as clinically overt bleeding associated with a drop in hemoglobin of ≥2 g/dL, a transfusion of ≥2 units of packed red blood cells or whole blood, bleeding at a critical site, or with a fatal outcome.
§ Fatal bleeding is adjudicated death with the primary cause of death from bleeding.
¶ Patients received either XARELTO or placebo once daily for 35 ±4 days starting in hospital and continuing post hospital discharge or received enoxaparin or placebo once daily for 10 ±4 days in the hospital.

Reduction of Risk of Major Cardiovascular Events in Patients with Chronic CAD or PAD

In the COMPASS trial, the most frequent adverse reactions associated with permanent drug discontinuation were bleeding events, with incidence rates of 2.7% for XARELTO 2.5 mg twice daily in combination with aspirin 100 mg once daily vs. 1.2% for aspirin 100 mg once daily.

Table 6 shows the number of patients experiencing various types of major bleeding events in the COMPASS trial.

Table 6: Major Bleeding Events* in COMPASS - On Treatment Plus 2 days

Parameter	XARELTO plus aspirin† N=9134 n (%/year)	Aspirin alone† N=9107 n (%/year)	XARELTO plus aspirin vs. Aspirin alone HR (95 % CI)
Modified ISTH Major Bleeding‡	263 (1.6)	144 (0.9)	1.84 (1.50, 2.26)
- Fatal bleeding event	12 (<0.1)	8 (<0.1)	1.51 (0.62, 3.69)
Intracranial hemorrhage (ICH)	6 (<0.1)	3 (<0.1)	2.01 (0.50, 8.03)
Non-intracranial	6 (<0.1)	5 (<0.1)	1.21 (0.37, 3.96)
- Symptomatic bleeding in critical organ (non-fatal)	58 (0.3)	43 (0.3)	1.36 (0.91, 2.01)
ICH	23 (0.1)	21 (0.1)	1.09 (0.61, 1.98)
Hemorrhagic Stroke	18 (0.1)	13 (<0.1)	1.38 (0.68, 2.82)
Other ICH	6 (<0.1)	9 (<0.1)	0.67 (0.24, 1.88)
- Bleeding into the surgical site requiring reoperation (non-fatal, not in critical organ)	7 (<0.1)	6 (<0.1)	1.17 (0.39, 3.48)
- Bleeding leading to hospitalization (non-fatal, not in critical organ, not requiring reoperation)	188 (1.1)	91 (0.5)	2.08 (1.62, 2.67)
Major GI bleeding	117 (0.7)	49 (0.3)	2.40 (1.72, 3.35)

* Major bleeding events within each subcategory were counted once per patient, but patients may have contributed events to multiple subcategories. These events occurred during treatment or within 2 days of stopping treatment.
† Treatment schedule: XARELTO 2.5 mg twice daily plus aspirin 100 mg once daily, or aspirin 100 mg once daily
‡ Defined as i) fatal bleeding, or ii) symptomatic bleeding in a critical area or organ, such as intraarticular, intramuscular with compartment syndrome, intraspinal, intracranial, intraocular, respiratory, pericardial, liver, pancreas, retroperitoneal, adrenal gland or kidney; or iii) bleeding into the surgical site requiring reoperation, or iv) bleeding leading to hospitalization.
CI: confidence interval; HR: hazard ratio; ISTH: International Society on Thrombosis and Hemostasis

Figure 2 shows the risk of modified ISTH major bleeding events across major subgroups.

Figure 2: Risk of Modified ISTH Major Bleeding Events by Baseline Characteristics in COMPASS – On Treatment Plus 2 Days

Other Adverse Reactions

Non-hemorrhagic adverse reactions reported in ≥1% of XARELTO-treated patients in the EINSTEIN DVT and EINSTEIN PE studies are shown in Table 7.

Table 7: Other Adverse Reactions* Reported by ≥1% of XARELTO-Treated Patients in EINSTEIN DVT and EINSTEIN PE Studies

Body System Adverse Reaction		
EINSTEIN DVT Study	**XARELTO 20 mg N=1718 n (%)**	**Enoxaparin/VKA N=1711 n (%)**
Gastrointestinal disorders		
Abdominal pain	46 (2.7)	25 (1.5)
General disorders and administration site conditions		
Fatigue	24 (1.4)	15 (0.9)
Musculoskeletal and connective tissue disorders		
Back pain	50 (2.9)	31 (1.8)
Muscle spasm	23 (1.3)	13 (0.8)
Nervous system disorders		
Dizziness	38 (2.2)	22 (1.3)
Psychiatric disorders		
Anxiety	24 (1.4)	11 (0.6)
Depression	20 (1.2)	10 (0.6)
Insomnia	28 (1.6)	18 (1.1)
EINSTEIN PE Study	**XARELTO 20 mg N=2412 n (%)**	**Enoxaparin/VKA N=2405 n (%)**
Skin and subcutaneous tissue disorders		
Pruritus	53 (2.2)	27 (1.1)

* Adverse reaction with Relative Risk >1.5 for XARELTO versus comparator

Non-hemorrhagic adverse reactions reported in ≥1% of XARELTO-treated patients in RECORD 1-3 studies are shown in Table 8.

Table 8: Other Adverse Drug Reactions* Reported by ≥1% of XARELTO-Treated Patients in RECORD 1-3 Studies

Body System Adverse Reaction	XARELTO 10 mg N=4487 n (%)	Enoxaparin† N=4524 n (%)
Injury, poisoning and procedural complications		
Wound secretion	125 (2.8)	89 (2.0)
Musculoskeletal and connective tissue disorders		
Pain in extremity	74 (1.7)	55 (1.2)
Muscle spasm	52 (1.2)	32 (0.7)
Nervous system disorders		
Syncope	55 (1.2)	32 (0.7)
Skin and subcutaneous tissue disorders		
Pruritus	96 (2.1)	79 (1.8)
Blister	63 (1.4)	40 (0.9)

* Adverse reaction occurring any time following the first dose of double-blind medication, which may have been prior to administration of active drug, until two days after the last dose of double-blind study medication
† Includes the placebo-controlled period of RECORD 2, enoxaparin dosing was 40 mg once daily (RECORD 1-3)

Postmarketing Experience

The following adverse reactions have been identified during post-approval use of XARELTO. Because these reactions are reported voluntarily from a population of uncertain size, it is not always possible to reliably estimate their frequency or establish a causal relationship to drug exposure.

Blood and lymphatic system disorders: agranulocytosis, thrombocytopenia
Gastrointestinal disorders: retroperitoneal hemorrhage
Hepatobiliary disorders: jaundice, cholestasis, hepatitis (including hepatocellular injury)
Immune system disorders: hypersensitivity, anaphylactic reaction, anaphylactic shock, angioedema
Nervous system disorders: cerebral hemorrhage, subdural hematoma, epidural hematoma, hemiparesis
Skin and subcutaneous tissue disorders: Stevens-Johnson syndrome, drug reaction with eosinophilia and systemic symptoms (DRESS)

DRUG INTERACTIONS

General Inhibition and Induction Properties

Rivaroxaban is a substrate of CYP3A4/5, CYP2J2, and the P-gp and ATP-binding cassette G2 (ABCG2) transporters. Combined P-gp and strong CYP3A inhibitors increase exposure to rivaroxaban and may increase the risk of bleeding. Combined P-gp and strong CYP3A inducers decrease exposure to rivaroxaban and may increase the risk of thromboembolic events.

Drugs that Inhibit Cytochrome P450 3A Enzymes and Drug Transport Systems

Interaction with Combined P-gp and Strong CYP3A Inhibitors

Avoid concomitant administration of XARELTO with known combined P-gp and strong CYP3A inhibitors (e.g., ketoconazole and ritonavir) *[see Warnings and Precautions and Clinical Pharmacology (12.3) in Full Prescribing Information]*.

Although clarithromycin is a combined P-gp and strong CYP3A inhibitor, pharmacokinetic data suggests that no precautions are necessary with concomitant administration with XARELTO as the change in exposure is unlikely to affect the bleeding risk *[see Clinical Pharmacology (12.3) in Full Prescribing Information]*.

Interaction with Combined P-gp and Moderate CYP3A Inhibitors in Patients with Renal Impairment

XARELTO should not be used in patients with CrCl 15 to <80 mL/min who are receiving concomitant combined P-gp and moderate CYP3A inhibitors (e.g., erythromycin) unless the potential benefit justifies the potential risk *[see Warnings and Precautions and Clinical Pharmacology (12.3) in Full Prescribing Information]*.

Drugs that Induce Cytochrome P450 3A Enzymes and Drug Transport Systems

Avoid concomitant use of XARELTO with drugs that are combined P-gp and strong CYP3A inducers (e.g., carbamazepine, phenytoin, rifampin, St. John's wort) *[see Warnings and Precautions and Clinical Pharmacology (12.3) in Full Prescribing Information]*.

Anticoagulants and NSAIDs/Aspirin

Coadministration of enoxaparin, warfarin, aspirin, clopidogrel and chronic NSAID use may increase the risk of bleeding *[see Clinical Pharmacology (12.3) in Full Prescribing Information]*.

Avoid concurrent use of XARELTO with other anticoagulants due to increased bleeding risk unless benefit outweighs risk. Promptly evaluate any signs or symptoms of blood loss if patients are treated concomitantly with aspirin, other platelet aggregation inhibitors, or NSAIDs *[see Warnings and Precautions]*.

USE IN SPECIFIC POPULATIONS

Pregnancy

Risk Summary

The limited available data on XARELTO in pregnant women are insufficient to inform a drug-associated risk of adverse developmental outcomes. Use XARELTO with caution in pregnant patients because of the potential for pregnancy related hemorrhage and/or emergent delivery. The anticoagulant effect of XARELTO cannot be reliably monitored with standard laboratory testing. Consider the benefits and risks of XARELTO for the mother and possible risks to the fetus when prescribing XARELTO to a pregnant woman *[see Warnings and Precautions]*.

Adverse outcomes in pregnancy occur regardless of the health of the mother or the use of medications. The estimated background risk of major birth defects and miscarriage for the indicated populations is unknown. In the U.S. general population, the estimated background risk of major birth defects and miscarriage in clinically recognized pregnancies is 2–4% and 15–20%, respectively.

Clinical Considerations

Disease-Associated Maternal and/or Embryo/Fetal Risk

Pregnancy is a risk factor for venous thromboembolism and that risk is increased in women with inherited or acquired thrombophilias. Pregnant women with thromboembolic disease have an increased risk of maternal complications including pre-eclampsia. Maternal thromboembolic disease increases the risk for intrauterine growth restriction, placental abruption and early and late pregnancy loss.

Fetal/Neonatal Adverse Reactions

Based on the pharmacologic activity of Factor Xa inhibitors and the potential to cross the placenta, bleeding may occur at any site in the fetus and/or neonate.

Labor or Delivery

All patients receiving anticoagulants, including pregnant women, are at risk for bleeding and this risk may be increased during labor or delivery *[see Warnings and Precautions]*. The risk of bleeding should be balanced with the risk of thrombotic events when considering the use of XARELTO in this setting.

Data

Human Data

There are no adequate or well-controlled studies of XARELTO in pregnant women, and dosing for pregnant women has not been established. Post-marketing experience is currently insufficient to determine a rivaroxaban-associated risk for major birth defects or miscarriage. In an *in vitro* placenta perfusion model, unbound rivaroxaban was rapidly transferred across the human placenta.

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Animal Data

Rivaroxaban crosses the placenta in animals. Rivaroxaban increased fetal toxicity (increased resorptions, decreased number of live fetuses, and decreased fetal body weight) when pregnant rabbits were given oral doses of ≥10 mg/kg rivaroxaban during the period of organogenesis. This dose corresponds to about 4 times the human exposure of unbound drug, based on AUC comparisons at the highest recommended human dose of 20 mg/day. Fetal body weights decreased when pregnant rats were given oral doses of 120 mg/kg during the period of organogenesis. This dose corresponds to about 14 times the human exposure of unbound drug. In rats, peripartal maternal bleeding and maternal and fetal death occurred at the rivaroxaban dose of 40 mg/kg (about 6 times maximum human exposure of the unbound drug at the human dose of 20 mg/day).

Lactation

Risk Summary

Rivaroxaban has been detected in human milk. There are insufficient data to determine the effects of rivaroxaban on the breastfed child or on milk production. Rivaroxaban and/or its metabolites were present in the milk of rats. The developmental and health benefits of breastfeeding should be considered along with the mother's clinical need for XARELTO and any potential adverse effects on the breastfed infant from XARELTO or from the underlying maternal condition *(see Data)*.

Data

Animal Data

Following a single oral administration of 3 mg/kg of radioactive [^{14}C]-rivaroxaban to lactating rats between Day 8 to 10 postpartum, the concentration of total radioactivity was determined in milk samples collected up to 32 hours post-dose. The estimated amount of radioactivity excreted with milk within 32 hours after administration was 2.1% of the maternal dose.

Females and Males of Reproductive Potential

Females of reproductive potential requiring anticoagulation should discuss pregnancy planning with their physician.

Pediatric Use

Safety and effectiveness in pediatric patients have not been established.

Geriatric Use

Of the total number of patients in the RECORD 1-3 clinical studies evaluating XARELTO, about 54% were 65 years and over, while about 15% were >75 years. In ROCKET AF, approximately 77% were 65 years and over and about 38% were >75 years. In the EINSTEIN DVT, PE and Extension clinical studies approximately 37% were 65 years and over and about 16% were >75 years. In EINSTEIN CHOICE, approximately 39% were 65 years and over and about 12% were >75 years. In the MAGELLAN study, approximately 67% were 65 years and over and about 37% were >75 years. In the COMPASS study, approximately 76% were 65 years and over and about 17% were >75 years. In clinical trials the efficacy of XARELTO in the elderly (65 years or older) was similar to that seen in patients younger than 65 years. Both thrombotic and bleeding event rates were higher in these older patients *[see Clinical Pharmacology (12.3) and Clinical Studies (14) in Full Prescribing Information]*.

Renal Impairment

In pharmacokinetic studies, compared to healthy subjects with normal creatinine clearance, rivaroxaban exposure increased by approximately 44 to 64% in subjects with renal impairment. Increases in pharmacodynamic effects were also observed *[see Clinical Pharmacology (12.3) in Full Prescribing Information]*.

Nonvalvular Atrial Fibrillation

Patients with Chronic Kidney Disease not on Dialysis

In the ROCKET AF trial, patients with CrCl 30 to 50 mL/min were administered XARELTO 15 mg once daily resulting in serum concentrations of rivaroxaban and clinical outcomes similar to those in patients with better renal function administered XARELTO 20 mg once daily. Patients with CrCl <30 mL/min were not studied, but administration of XARELTO 15 mg once daily is expected to result in serum concentrations of rivaroxaban similar to those in patients with moderate renal impairment *[see Clinical Pharmacology (12.3) in Full Prescribing Information]*.

Patients with End-Stage Renal Disease on Dialysis

Clinical efficacy and safety studies with XARELTO did not enroll patients with end-stage renal disease (ESRD) on dialysis. In patients with ESRD maintained on intermittent hemodialysis, administration of XARELTO 15 mg once daily will result in concentrations of rivaroxaban and pharmacodynamic activity similar to those observed in the ROCKET AF study *[see Clinical Pharmacology (12.2, 12.3) in Full Prescribing Information]*. It is not known whether these concentrations will lead to similar stroke reduction and bleeding risk in patients with ESRD on dialysis as was seen in ROCKET AF.

Treatment of DVT and/or PE and Reduction in the Risk of Recurrence of DVT and/or PE

In the EINSTEIN trials, patients with CrCl values <30 mL/min at screening were excluded from the studies, but administration of XARELTO is expected to result in serum concentrations of rivaroxaban similar to those in patients with moderate renal impairment (CrCl 30 to <50 mL/min) *[see Clinical Pharmacology (12.3) in Full Prescribing Information]*. Observe closely and promptly evaluate any signs or symptoms of blood loss in patients with CrCl 15 to <30 mL/min. Avoid the use of XARELTO in patients with CrCl <15 mL/min.

Prophylaxis of DVT Following Hip or Knee Replacement Surgery

The combined analysis of the RECORD 1-3 clinical efficacy studies did not show an increase in bleeding risk for patients with CrCl 30 to 50 mL/min and reported a possible increase in total venous thromboemboli in this population. In the RECORD 1-3 trials, patients with CrCl values <30 mL/min at screening were excluded from the studies, but administration of XARELTO 10 mg once daily is expected to result in serum concentrations of rivaroxaban similar to those in patients with moderate renal impairment (CrCl 30 to <50 mL/min) *[see Clinical Pharmacology (12.3) in Full Prescribing Information]*. Observe closely and promptly evaluate any signs or symptoms of blood loss in patients with CrCl 15 to <30 mL/min. Avoid the use of XARELTO in patients with CrCl <15 mL/min.

XARELTO® (rivaroxaban) tablets

Prophylaxis of Venous Thromboembolism in Acutely Ill Medical Patients at Risk for Thromboembolic Complications Not at High Risk of Bleeding

Patients with CrCl values <30 mL/min at screening were excluded from the MAGELLAN study. In patients with CrCl <30 mL/min a dose of XARELTO 10 mg once daily is expected to result in serum concentrations of rivaroxaban similar to those in patients with moderate renal impairment (CrCl 30 to <50 mL/min) *[see Clinical Pharmacology (12.3) in Full Prescribing Information]*. Observe closely and promptly evaluate any signs or symptoms of blood loss in patients with CrCl 15 to <30 mL/min. Avoid use of XARELTO in patients with CrCl <15 mL/min.

Reduction of Risk of Major Cardiovascular Events in Patients with Chronic CAD or PAD

Patients with Chronic Kidney Disease not on Dialysis

Patients with a CrCl <15 mL/min at screening were excluded from COMPASS, and limited data are available for patients with a CrCl of 15 to 30 mL/min. In patients with CrCl <30 mL/min, a dose of 2.5 mg XARELTO twice daily is expected to give an exposure similar to that in patients with moderate renal impairment (CrCl 30 to <50 mL/min) *[see Clinical Pharmacology (12.3) in Full Prescribing Information]*, whose efficacy and safety outcomes were similar to those with preserved renal function.

Patients with End-Stage Renal Disease on Dialysis

No clinical outcome data is available for the use of XARELTO with aspirin in patients with ESRD on dialysis since these patients were not enrolled in COMPASS. In patients with ESRD maintained on intermittent hemodialysis, administration of XARELTO 2.5 mg twice daily will result in concentrations of rivaroxaban and pharmacodynamic activity similar to those observed in moderate renal impaired patients in the COMPASS study *[see Clinical Pharmacology (12.2, 12.3) in Full Prescribing Information]*. It is not known whether these concentrations will lead to similar CV risk reduction and bleeding risk in patients with ESRD on dialysis as was seen in COMPASS.

Hepatic Impairment

In a pharmacokinetic study, compared to healthy subjects with normal liver function, AUC increases of 127% were observed in subjects with moderate hepatic impairment (Child-Pugh B).

The safety or PK of XARELTO in patients with severe hepatic impairment (Child-Pugh C) has not been evaluated *[see Clinical Pharmacology (12.3) in Full Prescribing Information]*.

Avoid the use of XARELTO in patients with moderate (Child-Pugh B) and severe (Child-Pugh C) hepatic impairment or with any hepatic disease associated with coagulopathy.

OVERDOSAGE

Overdose of XARELTO may lead to hemorrhage. Discontinue XARELTO and initiate appropriate therapy if bleeding complications associated with overdosage occur. Rivaroxaban systemic exposure is not further increased at single doses >50 mg due to limited absorption. The use of activated charcoal to reduce absorption in case of XARELTO overdose may be considered. Due to the high plasma protein binding, rivaroxaban is not dialyzable *[see Warnings and Precautions and Clinical Pharmacology (12.3) in Full Prescribing Information]*. Partial reversal of laboratory anticoagulation parameters may be achieved with use of plasma products. An agent to reverse the anti-factor Xa activity of rivaroxaban is available.

Product of Germany

Finished Product Manufactured by:
Janssen Ortho LLC
Gurabo, PR 00778

or

Bayer AG
51368 Leverkusen, Germany

Manufactured for:
Janssen Pharmaceuticals, Inc.
Titusville, NJ 08560

Licensed from:
Bayer HealthCare AG
51368 Leverkusen, Germany

janssen

cp-62545v7

IMPORTANT SAFETY INFORMATION

WARNING: (A) PREMATURE DISCONTINUATION OF XARELTO® INCREASES THE RISK OF THROMBOTIC EVENTS, (B) SPINAL/EPIDURAL HEMATOMA

A. Premature discontinuation of XARELTO® increases the risk of thrombotic events

Premature discontinuation of any oral anticoagulant, including XARELTO®, increases the risk of thrombotic events. If anticoagulation with XARELTO® is discontinued for a reason other than pathological bleeding or completion of a course of therapy, consider coverage with another anticoagulant.

B. Spinal/epidural hematoma

Epidural or spinal hematomas have occurred in patients treated with XARELTO® who are receiving neuraxial anesthesia or undergoing spinal puncture. These hematomas may result in long-term or permanent paralysis. Consider these risks when scheduling patients for spinal procedures. Factors that can increase the risk of developing epidural or spinal hematomas in these patients include:

- **Use of indwelling epidural catheters**
- **Concomitant use of other drugs that affect hemostasis, such as non-steroidal anti-inflammatory drugs (NSAIDs), platelet inhibitors, other anticoagulants, *see* Drug Interactions**
- **A history of traumatic or repeated epidural or spinal punctures**
- **A history of spinal deformity or spinal surgery**
- **Optimal timing between the administration of XARELTO® and neuraxial procedures is not known**

Monitor patients frequently for signs and symptoms of neurological impairment. If neurological compromise is noted, urgent treatment is necessary.

Consider the benefits and risks before neuraxial intervention in patients anticoagulated or to be anticoagulated for thromboprophylaxis.

CONTRAINDICATIONS

- Active pathological bleeding
- Severe hypersensitivity reaction to XARELTO® (eg, anaphylactic reactions)

WARNINGS AND PRECAUTIONS

- **Increased Risk of Thrombotic Events after Premature Discontinuation:** Premature discontinuation of any oral anticoagulant, including XARELTO®, in the absence of adequate alternative anticoagulation increases the risk of thrombotic events. An increased rate of stroke was observed during the transition from XARELTO® to warfarin in clinical trials in atrial fibrillation patients. If XARELTO® is discontinued for a reason other than pathological bleeding or completion of a course of therapy, consider coverage with another anticoagulant.
- **Risk of Bleeding:** XARELTO® increases the risk of bleeding and can cause serious or fatal bleeding. Promptly evaluate any signs or symptoms of blood loss and consider the need for blood replacement. Discontinue in patients with active pathological hemorrhage.
  - An agent to reverse the anti-factor Xa activity of rivaroxaban is available. Because of high plasma protein binding, rivaroxaban is not dialyzable.
  - Concomitant use of other drugs that impair hemostasis increases risk of bleeding. These include aspirin, $P2Y_{12}$ platelet inhibitors, dual antiplatelet therapy, other antithrombotic agents, fibrinolytic therapy, NSAIDs, selective serotonin reuptake inhibitors (SSRIs), and serotonin norepinephrine reuptake inhibitors (SNRIs).
  - Risk of Hemorrhage in Acutely Ill Medical Patients at High Risk of Bleeding: Acutely ill medical patients with the following conditions are at increased risk of bleeding with the use of XARELTO® for primary VTE prophylaxis: history of bronchiectasis, pulmonary cavitation, or pulmonary hemorrhage; active cancer (ie, undergoing acute, in-hospital cancer treatment); active gastroduodenal ulcer or history of bleeding in the three months prior to treatment; or dual antiplatelet therapy. XARELTO® is not for use for primary VTE prophylaxis in these hospitalized, acutely ill medical patients at high risk of bleeding.
- **Spinal/Epidural Anesthesia or Puncture:** When neuraxial anesthesia (spinal/epidural anesthesia) or spinal puncture is employed, patients treated with anticoagulant agents for prevention of thromboembolic complications are at risk of developing an epidural or spinal hematoma, which can result in long-term or permanent paralysis. To reduce the potential risk of bleeding associated with concurrent use of XARELTO® and epidural or spinal anesthesia/analgesia or spinal puncture, consider the pharmacokinetic profile of XARELTO®. Placement or removal of an epidural catheter or lumbar puncture is best performed when the anticoagulant effect of XARELTO® is low; however, the exact timing to reach a sufficiently low anticoagulant effect in each patient is not known. An indwelling epidural or intrathecal catheter should not be removed before at least 2 half-lives have elapsed (ie, 18 hours in young patients aged 20 to 45 years and 26 hours in elderly patients aged 60 to 76 years), after the last administration of XARELTO®. The next dose should not be administered earlier than 6 hours after the removal of the catheter. If traumatic puncture occurs, delay the administration of XARELTO® for 24 hours. Monitor frequently to detect signs or symptoms of neurological impairment, such as midline back pain, sensory and motor deficits (numbness, tingling, or weakness in lower limbs), or bowel and/or bladder dysfunction. Instruct patients to immediately report any of the above signs or symptoms. If signs or symptoms of spinal hematoma are suspected, initiate urgent diagnosis and treatment including consideration for spinal cord decompression even though such treatment may not prevent or reverse neurological sequelae.
- **Use in Patients with Renal Impairment:**
  - **Nonvalvular Atrial Fibrillation:** Periodically assess renal function as clinically indicated (ie, more frequently in situations in which renal function may decline) and adjust therapy accordingly. Consider dose adjustment or discontinuation in patients who develop acute renal failure while on XARELTO®. Clinical efficacy and safety studies with XARELTO® did not enroll patients with CrCl <30 mL/min or end-stage renal disease (ESRD) on dialysis.
  - **Treatment of Deep Vein Thrombosis (DVT), Pulmonary Embolism (PE), and Reduction in the Risk of Recurrence of DVT and of PE:** In patients with CrCl <30 mL/min, rivaroxaban exposure and pharmacodynamic effects are increased compared to patients with normal renal function. There are limited clinical data in patients with CrCl 15 to <30 mL/min; therefore, observe closely and promptly evaluate any signs or symptoms of blood loss in these patients. There are no clinical data in patients with CrCl <15 mL/min (including patients on dialysis); therefore, avoid the use of XARELTO® in these patients. Discontinue XARELTO® in patients who develop acute renal failure while on treatment.
  - **Prophylaxis of Deep Vein Thrombosis Following Hip or Knee Replacement Surgery:** In patients with CrCl <30 mL/min, rivaroxaban exposure and pharmacodynamic effects are increased compared to patients with normal renal function. There are limited clinical data in patients with CrCl 15 to <30 mL/min; therefore, observe closely and promptly evaluate signs or symptoms of blood loss in these patients. There are no clinical data in patients with CrCl <15 mL/min (including patients on dialysis); therefore, avoid the use of XARELTO® in these patients. Discontinue XARELTO® in patients who develop acute renal failure while on treatment.
  - **Prophylaxis of Venous Thromboembolism in Acutely Ill Medical Patients at Risk for Thromboembolic Complications Not at High Risk of Bleeding:** In patients with CrCl <30 mL/min, rivaroxaban exposure and pharmacodynamic effects are increased compared to patients with normal renal function. There are limited clinical data in patients with CrCl 15 to <30 mL/min; therefore, observe closely and promptly evaluate any signs or symptoms of blood loss in these patients. There are no clinical data in patients with CrCl <15 mL/min (including patients on dialysis); therefore, avoid the use of XARELTO® in these patients. Discontinue XARELTO® in patients who develop acute renal failure while on treatment.
  - **Reduction of Risk of Major Cardiovascular Events in Patients with Chronic CAD or PAD:** For patients with CrCl <15 mL/min, no data are available, and limited data are available for patients with a CrCl of 15 to 30 mL/min. In patients with CrCl <30 mL/min, a dose of 2.5 mg XARELTO® twice daily is expected to give an exposure similar to that in patients with moderate renal impairment (CrCl 30 to <50 mL/min), whose efficacy and safety outcomes were similar to those with preserved renal function. Clinical efficacy and safety studies with XARELTO® did not enroll patients with end-stage renal disease (ESRD) on dialysis.
- **Use in Patients with Hepatic Impairment:** No clinical data are available for patients with severe hepatic impairment. Avoid use in patients with moderate (Child-Pugh B) and severe (Child-Pugh C) hepatic impairment or with any hepatic disease associated with coagulopathy, since drug exposure and bleeding risk may be increased.
- **Use with P-gp and Strong CYP3A Inhibitors or Inducers:** Avoid concomitant use of XARELTO® with known combined P-gp and strong CYP3A inhibitors or inducers.
- **Risk of Pregnancy-Related Hemorrhage:** In pregnant women, XARELTO® should be used only if the potential benefit justifies the potential risk to the mother and fetus. XARELTO® dosing in pregnancy has not been studied. The anticoagulant effect of XARELTO® cannot be monitored with standard laboratory testing. Promptly evaluate signs or symptoms suggesting blood loss (eg, a drop in hemoglobin and/or hematocrit, hypotension, or fetal distress).
- **Patients with Prosthetic Heart Valves:** Use of XARELTO® is not recommended in patients who have had transcatheter aortic valve replacement (TAVR), based on the results of the GALILEO study, which reported higher rates of death and bleeding in patients randomized to XARELTO® compared to those randomized to an antiplatelet regimen. Safety and efficacy of XARELTO® have not been studied in patients with other prosthetic heart valves or other valve procedures. Use of XARELTO® is not recommended in patients with prosthetic heart valves.
- **Acute PE in Hemodynamically Unstable Patients/Patients Who Require Thrombolysis or Pulmonary Embolectomy:** Initiation of XARELTO® is not recommended acutely as an alternative to unfractionated heparin in patients with pulmonary embolism who present with hemodynamic instability or who may receive thrombolysis or pulmonary embolectomy.

Please read accompanying Brief Summary of full Prescribing Information, including Boxed WARNINGS for XARELTO®.

Xarelto®
rivaroxaban tablets

Xarelto® rivaroxaban tablets

BECAUSE A THROMBOTIC EVENT DOESN'T ALWAYS COME WITH A WARNING

CHOOSE XARELTO® TO HELP PROTECT THEM FROM THE UNEXPECTED

The DOAC with the most FDA-approved indications to treat and help protect against thrombotic events

▸ **APPROVED** in acutely ill medical patients*

INDICATIONS

XARELTO® (rivaroxaban) is indicated to reduce the risk of stroke and systemic embolism in patients with nonvalvular atrial fibrillation (AF).

There are limited data on the relative effectiveness of XARELTO® and warfarin in reducing the risk of stroke and systemic embolism when warfarin therapy is well controlled.

XARELTO® is indicated for the treatment of deep vein thrombosis (DVT). XARELTO® is indicated for the treatment of pulmonary embolism (PE). XARELTO® is indicated for the reduction in the risk of recurrence of DVT and/or PE in patients at continued risk for recurrent DVT and/or PE after completion of initial treatment lasting at least 6 months.

*XARELTO® is indicated for the prophylaxis of venous thromboembolism (VTE) and VTE-related death during hospitalization and post hospital discharge in adult patients admitted for an acute medical illness who are at risk for thromboembolic complications due to moderate or severe restricted mobility and other risk factors for VTE, and not at high risk of bleeding.

XARELTO® is indicated for the prophylaxis of DVT, which may lead to PE in patients undergoing knee or hip replacement surgery.

XARELTO® is indicated, in combination with aspirin, to reduce the risk of major cardiovascular events (cardiovascular [CV] death, myocardial infarction [MI], and stroke) in patients with chronic coronary artery disease (CAD) or peripheral artery disease (PAD).

IMPORTANT SAFETY INFORMATION (cont'd)

WARNINGS AND PRECAUTIONS (cont'd)

- **Increased Risk of Thrombosis in Patients with Antiphospholipid Syndrome:** Direct-acting oral anticoagulants (DOACs), including XARELTO®, are not recommended for use in patients with triple-positive antiphospholipid syndrome (APS). For patients with APS (especially those who are triple positive [positive for lupus anticoagulant, anticardiolipin, and anti-beta 2-glycoprotein I antibodies]), treatment with DOACs has been associated with increased rates of recurrent thrombotic events compared with vitamin K antagonist therapy.

DRUG INTERACTIONS

- Combined P-gp and strong CYP3A inhibitors increase exposure to rivaroxaban and may increase risk of bleeding.
- Combined P-gp and strong CYP3A inducers decrease exposure to rivaroxaban and may increase risk of thromboembolic events.
- XARELTO® should not be used in patients with CrCl 15 to <80 mL/min who are receiving concomitant combined P-gp and moderate CYP3A inhibitors (eg, erythromycin) unless the potential benefit justifies the potential risk.
- Coadministration of enoxaparin, warfarin, aspirin, clopidogrel, and chronic NSAID use may increase risk of bleeding.
- Avoid concurrent use of XARELTO® with other anticoagulants due to increased bleeding risk, unless benefit outweighs risk. Promptly evaluate signs or symptoms of blood loss if patients are treated concomitantly with aspirin, other platelet aggregation inhibitors, or NSAIDs.

USE IN SPECIFIC POPULATIONS

- **Pregnancy:** The limited available data on XARELTO® in pregnant women are insufficient to inform a drug-associated risk of adverse developmental outcomes. Use XARELTO® with caution in pregnant patients because of the potential for pregnancy-related hemorrhage and/or emergent delivery. The anticoagulant effect of XARELTO® cannot be reliably monitored with standard laboratory testing. Consider the benefits and risks of XARELTO® for the mother and possible risks to the fetus when prescribing to a pregnant woman.
  - Fetal/Neonatal adverse reactions: Based on the pharmacologic activity of Factor Xa inhibitors and the potential to cross the placenta, bleeding may occur at any site in the fetus and/or neonate.
  - Labor or delivery: The risk of bleeding should be balanced with the risk of thrombotic events when considering use in this setting.
  - There are no adequate or well-controlled studies of XARELTO® in pregnant women, and dosing for pregnant women has not been established. Post-marketing experience is currently insufficient to determine a rivaroxaban-associated risk for major birth defects or miscarriage.
- **Lactation:** Rivaroxaban has been detected in human milk. There are insufficient data to determine the effects of rivaroxaban on the breastfed child or on milk production. Consider the developmental and health benefits of breastfeeding along with the mother's clinical need for XARELTO® and any potential adverse effects on the breastfed infant from XARELTO® or from the underlying maternal condition.
- **Females and Males of Reproductive Potential:** Females of reproductive potential requiring anticoagulation should discuss pregnancy planning with their physician.
- **Pediatric Use:** Safety and effectiveness in pediatric patients have not been established.

OVERDOSAGE

- Overdose of XARELTO® may lead to hemorrhage. Discontinue XARELTO® and initiate appropriate therapy if bleeding complications associated with overdosage occur. An agent to reverse the anti-factor Xa activity of rivaroxaban is available.

ADVERSE REACTIONS IN CLINICAL STUDIES

- Most common adverse reactions with XARELTO® were bleeding complications.

Please read accompanying Brief Summary of full Prescribing Information, including Boxed WARNINGS for XARELTO®.

cp-62551v6

DOAC = direct oral anticoagulant.

XARELTO® is licensed from Bayer HealthCare AG, 51368 Leverkusen, Germany.

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Xarelto® rivaroxaban tablets

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